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NOTES ON "THE BIRDS OF BOMBAY," BY LIEUT.  
H. E. BARNES.\*

(BY H. LITLEDALE, Baroda.)

It would be presumptuous for a mere tyro in ornithology like myself to attempt a detailed or formal criticism of Mr. Barnes's book. It seems to me, speaking generally, to be very fairly done, and to furnish, what many sportsmen and naturalists will be glad to have, a cheap and comprehensive descriptive catalogue of the birds of the Presidency. Until its publication, naturalists have had to get "Jerdon's Birds," "Stray Feathers," Hume and Marshall's "Game-birds," Sharpe's "Catalogue of Birds," Hume's "Nests and Eggs," and other books, costing in all about Rs. 400, and requiring a book-case to hold them, besides entailing much labour to search out particular birds. Now we have this handy and well-printed volume, that will give most that we want for ordinary purposes, will go into a game bag, and costs only Rs. 8.

Besides presenting the descriptions and measurements of birds as found in Jerdon and other writers, this Handbook contains the results of Mr. Barnes's twenty years' work at the birds of this Presidency, and I have read these scattered observations with so much interest that, like Oliver Twist, I cannot help asking for more. And that "more" Mr. Barnes might certainly have given me if he had called on his fellow-ornithologists of this Society to let him have the use of their field note-books for his work; in records of, and deductions from, field ornithology, the more workers the better work. Hence, if, in the following hastily jotted remarks, I appear to grumble somewhat, it is in no fault-finding or ungrateful spirit; my object is addition, not subtraction, and I heartily thank Mr. Barnes for what he has done, and advise every good sportsman to buy and study his book.

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\* *Handbook to the Birds of the Bombay Presidency*, by Lieut. H. EDWIN BARNES, D.A.C., Central Press, Calcutta, 1885. Price Rs. 8-8, V.P.P.

Passing over questions of nomenclature, and shunning such a Charybdis as the discrimination of difficult species (like *Aquila Nævia*), I consider that, in the remarks on distribution and on nests and eggs in particular, Mr. Barnes has not only lost much good material that our birds' nesting members would gladly have contributed, but he has also not made as good use of his actual authorities as he might have done. The care and fulness with which the nidification of many birds is described, make me wonder that nothing is said of the nests and eggs of many other birds, which are all more or less fully dealt with in books that Mr. Barnes had before him when compiling his work. For instance, Mr. Barnes says that he has been unable to ascertain anything about the breeding of *Elanus cæruleus*, the black-winged kite, whereas there is a full account (from the competent pen of Mr. Davidson) in "Stray Feathers," Vol. viii., pp. 370 and 415, to say nothing of Bree's "Birds of Europe," Vol. i.

I may add that, on the 23rd October 1885, I had a nest with three hard set eggs taken, and the two birds shot, at Tandalja, two miles from Baroda, and that earlier in the same month I found a nest at Tatarpura, six miles from Baroda, with young birds in it. The eggs were, as Mr. Hume says somewhere, like "miniature Neophrons," and not like Dr. Bree's figures.

Again, while describing the eggs of the *Prinias*, Mr. Barnes omits to point out that the mahogany-coloured eggs are laid by the species with *ten* tail-feathers, while the birds with *twelve* tail-feathers lay eggs of a different type. Of the eggs of *Prinia gracilis* and *P. Hodgsoni* (the two species are, I am convinced, identical, the latter being the breeding plumage), Mr. Barnes says not a word. The eggs are remarkable, being of two types of ground colour, *viz.*, pure white and pale blue, and being either unspotted, or speckled with light red. There are, therefore, four varieties of the eggs of these tiny birds. They are very common about Baroda, and breed along the railway line. The eggs in all the twenty odd nests I found last August were uniform in each nest, *i.e.*, all in each nest were either pure white, or pure bluish, or white, speckled red, or blue, speckled red, but I have found the several types in different nests only a few yards apart, and could see no external difference in the birds. Again, Mr. Barnes is rather careless in saying of the tailor-bird, *O. sutorius*, that "occasionally the eggs are of a greenish white colour." There are (as Mr. Hume has pointed out) two types of *ground* colour, either pure white or pale greenish blue, but *both* types

are blotched with red-brown. Mr. Barnes's words would lead one to suppose that the latter type was occasionally without markings, which is never the case. His description of the tailor-bird, I may add, does not discriminate the sexes sufficiently.

With regard to the nesting of the common Indian Swift (*C. affinis*) I may add to Mr. Barnes's observations the curious fact that on the 23rd February 1885 the nests of a colony of the cliff swallow (*H. fluvicola*) under the City Bridge, Baroda, were found by me to be occupied by about fifty of these swifts, who had eggs and young in them, while the cliff swallows had been forced to build a fresh cluster of nests further under the arch for their February brood. The nests the swifts had taken were probably those built by the cliff swallows for their previous September clutch, as last October I found that the young cliff swallows had all just flown and that a few young swifts were still unfledged in the nests of *H. fluvicola*.\*

Speaking of the swifts, Mr. Barnes calls *C. melba* (the Alpine Swift), a somewhat rare cold weather visitant. I saw seven and shot one near Baroda on the 21st September 1885, which is well before the "cold weather."

Since the publication of Captain Marshall's useful book, "Bird's Nesting in India," in which the eggs of *Caprimulgus Mahrattensis* are stated to be unknown, Mr. Doig found them to be common in Sind, and described them in "Stray Feathers" (Vol. viii., p. 372). Mr. Barnes does not describe the eggs, which, out of Sind at least, would be a valuable find for an oologist.

The blue-tailed bee-eater, says Mr. Barnes, "occurs sparingly throughout our district." It is common along the Guzerat rivers, and I have seen hundreds along the Mahi from Wasad to Dabka. They move to the tanks and meadows, especially those near the telegraph wires, in the rains, returning to the larger rivers as the country dries up. I took thirty eggs last year from deep holes in nullahs along the Mahi—eggs like those of *M. viridis*, but larger. In Guzerat the common bee-eater is called *tilwa*: Mr. Barnes gives "hurrial" as the Hind. name. I do not see what Hind. names have to do with the Bombay Presidency. A guide to the birds of this side of India should give the names in as many as possible of the local vernaculars, and should be rich in such details. Mr. Barnes's book is very deficient in this respect, and I would suggest that our Society

\* Canon Tristram *Fauna and Flora of Palestine*, p. 84, notes the same of *C. affinis*. I may remark "that the Baroda swifts had not made any addition [of an agglutinated straw and feather entrance to the original edifice of clay," as in Palestine.

might compile a list of the Marathi, Guzerati, Sindhi, Canarese, Bhil, &c., names of the better-known birds. I have already made a beginning at such a list of the Guzerati names.

The Indian stork-billed kingfisher, *P. gurial*, has not, Mr. Barnes says, been recorded from Guzerat. Certainly it is not in Captain. Butler's list, but I shot one in a banyan tree on the bank of Jaoli tank, 20 miles north of Baroda, on the 3rd of November last, and Mr. Davidson writes to me that "this species breeds at Godhra behind the Collector's bungalow." The little Indian kingfisher, Mr. Barnes says, lays five or six eggs. Last year I three times found seven eggs in a nest. On the 27th August 1884, in the middle of the rains, I found a nest with five fresh eggs near my house: about three months later than they are usually supposed to breed. Mr. Barnes is partly mistaken in saying that the Pied Kingfisher *never* resorts to wells or tanks. On the tanks hereabouts they reside and breed commonly. And why does Mr. Barnes tell us nothing about the wonderful breeding habits of the Hornbills?

As regards the koel, every naturalist has a different tale to tell; but I have found koel's eggs in crow's nests in which there was no crow's egg: it seems improbable that the koel would have laid in an empty nest. Once I actually found near Baroda four koel's eggs, ready to hatch, in a crow's nest in which there was no crow's egg! This looks as if the koel, sometimes at least, removed the crow's eggs, unless, indeed, we suppose that the crow having no family of her own had adopted the koel's! Birds do such queer things! I once found a Pariah kite sitting close on a hare's skull!

On page 137, No. 235 is misprinted 205, and I remember noticing an unnecessary *d* in the middle of *Blanford* somewhere. No. 238, *Dicæum minimum*, I have several times met with here, and I have found one nest, which was, however, deserted afterwards, having incautiously been touched. Mr. Barnes could have found sufficient information about this species in Hume's "Nests and Eggs." Of the beautiful nest and eggs of *Piprisoma agile*, the thick-billed flower-pecker, Mr. Barnes gives no particulars. As it is not in Butler's Guzerat list, I may state that I found three nests at Baroda in last May and June.

The black-headed cuckoo shrike (*V. sykesii*) comes about June 1st, breeds about Baroda in the end of June and beginning of July, and leaves about November. I found four nests last season. The large grey cuckoo shrike (*Graucalus macei*) is a permanent resident

here. I found six nests last August near Baroda, each with one egg; and my men found a nest building in the Police Lines at Khaira, on the 10th October; unfortunately it was destroyed by monkeys.

Mr. Barnes gives no details of the nesting of these two species, though Hume describes both, and Jerdon the latter. Can Mr. Barnes give us any information about the nesting of the white-bellied drongo, *B. cerulescens*? It occurs sparingly here between November and April, but seems to go east to the hills to breed.

The Paradise fly-catcher (*M. paradisi*) is very common here during the rains, when it breeds. In all instances except one out of nine nests that I found with eggs last June and July, the birds were in the chestnut plumage, and in that one case the male was white and the female chestnut. The mynas destroyed three nests of one pair of paradise fly-catchers that built in a mango tree near my house. I saw the little fly-catcher defend her first nest for nearly twenty minutes against a myna, that at last retired. Next day, however, the nest was torn to bits, by the myna I suppose. It was twice rebuilt on other branches of the same tree, with the same result. I don't know where she bred after leaving that tree in disgust.

Mr. Barnes has overlooked the description of the eggs of *Cyornis Tickelli* in *Nests and Eggs*; and surely to say only of *Dumetia albogularis*, the white-throated wren-babbler, that "it is probably a permanent resident," is to leave out of sight much common information. It is a permanent resident here, and last August I found many nests, which, with the eggs, resembled those described in *Nests and Eggs*.

I may record that 452, *Ixos luteolus*, the white-browed bush bulbul, is common in the ravines along the Mahi and not scarce about Baroda. It seems to prefer the neighbourhood of water and is a hard bird to see, though there is no mistaking its musical trill from some deep thicket. It is not given in Butler's Guzerat list. The Indian oriole, which, Mr. Barnes says, he has found chiefly breeding on *neem* trees, here prefers mango or mhowra trees. I can assure Mr. Barnes that he is quite mistaken in thinking that the Magpie Robin, *C. saularis*, does not remain to breed in Guzerat. It is a permanent resident hereabouts, and I found between May 30th and June 26th last eight nests within a mile of my house. The number of eggs or young varied from two (young) to six (hard set eggs). I have seen the Dayal (a name also given here

to the tailor-bird) in all months here, and have often noticed the peculiar flurting of the tail over the head, mentioned by Layard (in Jerdon, who says he has not observed it).

What is a "seasonal visitant," cold season or wet season or hot season,—who can tell? At any rate *Phylloscopus tristis* is a "seasonal visitant," while the other *Phylloscopi* are "cold weather visitants." And why repeat Linnaeus's old misprint of *Anthus Spinoletta* when naturalists like Prof. Newton give the true form *spipoletta* (Yarrell, 4th ed.). And while Mr. Barnes was "at his larks," he might have told us what was the character of the hind claw of the genus *Corydalla* (p. 244). Mr. Barnes says the white-eyed tit (*Z. palpebrosa*) is a common permanent resident in the Deccan, but that "in other parts of the Presidency it only occurs, I believe, as a cold weather visitant." I can certify that it breeds here, and is fairly common, and that I have seen it in nearly every month. I can also assure Mr. Barnes that *Dendrocitta rufa*, the Indian Tree-pie, breeds here, and is fairly common all the year round. He says they become very scarce during the hot weather, and certainly I have seen great numbers of them then in the hill jungles of Abu and the Vindhya, but they do not migrate from our Guzerat plains. They are very shy and wary birds when breeding, and the nests in the thick mango foliage are hard to find. As Captain Marshall says "the eggs of the rose-coloured paster (*P. roseus*) are not known," and as Mr. Barnes does not mention them, I may note that a full and very interesting account of the breeding of these birds is given in the last edition of Yarrell. I may also say that I kept 18 of them in a large aviary last season till September, in the hope of their breeding in captivity, but without success.

*Estrellda formosa*, the green wax-bill, is not very rare hereabouts, occurring generally in flocks. The common pea-hen I have found breeding here in the fork of a mango trunk, 10 feet from the ground, but here, as elsewhere, the usual site is on the ground. Mr. Barnes ought to have noted that the male of *Turnix taigoor*, the black-breasted bustard quail, sits on the eggs and minds the babies, while the female goes round to fight the ladies of the neighbouring families. This brings me up to the grallatores, and I will give only a few more selections from very many *marginalia* on Mr. Barnes's Handbook.

The lesser florican visits Baroda in small numbers during the rains, and breeds here; but a few remain here all the year round, as I have shot them in the following months: February, April, May,

June, July, October. I have seen, but not shot them in August and September. They are not so much reduced by shooting (as Mr. Barnes says) as by snaring. Many are brought in alive to the Camp Bazaar, and sent to me and others as presents, their legs being most cruelly tied with feathers plucked from their own wings. I have released several that had been so tied, and have found that it took several days for them to recover sufficiently for them to leave my garden. The pelican ibis breeds here at Chittral and at Thasra in October. The shell ibis breeds in large numbers, with the white ibis and snake bird, near Khaira. Mr. Barnes says he cannot find any record of the occurrence of the cotton-teal in Guzerat. It is very common, especially in May and June, when there are hundreds on Muwal tank, 20 miles north of Baroda. When the rains fall, they disperse over the country and take up their quarters in some small pond or pool, occasionally

Affording scarce such breadth of brim,  
As served the wild duck's brood to swim,

and they nest in the neighbourhood. I extracted a full-sized soft egg from a bird shot near this last September. Mr. Barnes could have found it recorded in Butler's *Gazetteer* list. But enough has been said, I hope, to justify, even from my own very limited experience, the opinion with which I set out, that Mr. Barnes might have got much additional information if he had asked the "Bombay Natural History Society" for it, and might thereby have rendered his book still more deserving than it is at present of being regarded as the standard authority on the birds of the Bombay Presidency.

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ON A HYBRID, *OVIS HODGSONI*, CUM *VIGNEI*,  
DISCOVERED AND SHOT BY MONS. H.  
DAUVERGNE,

BY R. A. STERNDALÉ, F.Z.S., &c.

HYBRIDIZATION between the various known species of *Capra* and *Ovis* has been abundantly proved by the instances that have occurred in the London Zoological Gardens. In 1864 and 1865-67 and 1868, a female *Capra* *Ægagrus*, the Persian Ibex, bore seven kids, the father of which was a Markhor *C. Megaceros*. In 1872 a hybrid between a male *Ovis* *Aries* and a female *Ovis* *Musimon*; in 1871 two hybrids between *Ovis* *Musimon*, the Corsican Moufflon, and our Indian *Ovis* *Cycloceros* were born; also in 1871 and 1882 two between the former and *Ovis* *Aries*. There are two species of deer

from Philippine Islands, *Cervus Nigricans* and *Cervus Alfredi* which have twice bred in the gardens, and so have the European and Mesopotamian fallow deer. Sir Victor Brooke in one of his letters to me says he has known the common red deer and the Japanese deer to interbreed. So far the question of interbreeding is amply proved, but the interesting feature of the case is how far is this carried out in the wild state so as to create new species. I am of opinion that, if the truth were fully known, we should have to narrow down our list of goats and sheep. It is an undecided question whether *Ovis Polii* and *Ovis Karelini*, the two great sheep of the Pamir steppes, are not one and the same, and I think that *Ovis Brookei* is the hybrid which forms the subject of this paper. Sir Victor Brooke in a letter to me says: "If we can prove that the form is a hybrid between those two species (*i.e.*, *O. Hodgsoni* et *Vignei*), it will be much more interesting than if it should prove what is called a distinct species. I do not think the presence of one or even several male *O. Hodgsoni* amongst herds of *O. Vignei* would originate a breed of sheep intermediate in size and character between the two species, the much larger quantity of *Ovis Vignei* blood in the district would, in my opinion, prevail over the infusion of *O. Hodgsoni* blood introduced in such small quantities, and the thus originated larger animals would throw back to the parent stock. If it is a case of hybridization what we should find would be herds of *O. Vignei* with here and there large animals mixing and running with them of *O. Brookei* forms." Now this is exactly what Mons. Dauvergne found. In the mountain range south of the Indus near Zanskar, the precise locality being for obvious reasons withheld from publication, a herd of *Ovis Vignei* were observed for some years to contain a large ram of *Ovis Hodgsoni*, which drove out the weaker Shapoo rams and appropriated the ewes of the herd. He was ultimately one winter killed and eaten by *Chankos* (the Tibetan wolf), but during his stay he produced a family of hybrids possessing greater size of horn and head with characteristic colouring, combining traits of both animals. In course of time these hybrids were crossed again with the *Vignei* stock, and the third generation shows signs of degeneration from the larger sheep and of reversion to the *Vignei* type.

The skull of the half-bred animals, which the Tartars called *Nyan Shapoo* (the former being the name of the *Hodgsoni* or Ammon



and the latter of the *Vignei*), is nearer in size to *Hodgsoni*, which is double that of the other. The horns of these are rounded in front resembling what has been figured of *Brookei*, but hollowed out behind like *Vignei*. The horns of the quarter-bred are square in front and hollowed behind like the true Shapoo type, but are more massive than the pure-bred Shapoo.\*

Now as regards the colour of the skin. The *Nyan* or *Hodgsoni* has no black beard or throat-stripe which *Vignei* has. The half-bred shows no black, but the quarter-bred does in a modified but decided degree. The half-bred turns also in summer to the colour of *Hodgsoni*, having more of a blue grey or lavender tint and less of the fawn colour of *Vignei* with the white throat of *Hodgsoni*, it also gets the dark patch at the side of the neck. The skin of a quarter-bred specimen before me is of a bright fawn above; sides and rump white, and a black stripe down the middle of the throat.

The skull characteristics are as follows :—

	<i>Ovis Hodgson.</i>	<i>Half- hybrid.</i>	<i>Quarter hybrid.</i>	<i>Ovis Vignei.</i>
	Inches.	Inches.	Inches	Inches.
Girth of horn .....	16½	13½	11¼	10
Length of horns .....	36	32	22¾	30¼
Length of skull from between horns to tip of premaxillæ .....	13½	12	9½	9¼
Breadth between orbits .....	6⅛	5½	4⅝	3¾
Ditto between frontal sinuses.....	2¾	2⅞	2⅜	2
Length of teeth ... ..	3½	3¼	3	2⅞
Broadest part of palate .....	2¼	2¼	2	1¾
	80⅝	71⅜	55½	59⅞ 52⅜

In this table there are two noticeable points. It is plain that there is a gradual reversion to the size of *Ovis Vignei*, but although the quarter-bred hybrid has a greater girth of horn than the *Vignei*, the latter has greater length; and this gives it an advantage in all round measurement. Take off these extra 7½ inches in length of horn, and the Shapoo stands at 52¾ against the quarter-bred's 55½; over 3 inches less. Now comes the question of locality. The nearest *Hodgsoni* ground to where the Shapoo were located was over sixty miles off, but this is not a barrier to an animal like the Ammon who would cover such a distance in a couple of days.

R. A. S.

\* I have figured the half-bred horns with rounded fronts on account of their resemblance to the type of *Ovis Brookei*, but I have received another pair of hybrid (half-bred) horns which are quite square in front and as massive as the rounded ones.—R.A.S.

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BIRDS' NESTING IN RAJPOOTANA,  
(BY LIEUT. H. EDWIN BARNES, D. A. C.)

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THESE notes refer only to Neemuch, which, although in Rajpootana, is under the Central Indian Administration.

I was stationed there from December 1883 to the commencement of September 1885, and during the whole time I collected vigorously, but still there are many birds that do undoubtedly breed there that I have overlooked; of these I append a list.

The periods quoted, over which the different breeding seasons extend, were ascertained from personal observation, and represent the time between the earlier and later nests.

2.—*Otologyps calvus* : SCOP.

The King Vulture breeds from the middle of February to about the middle of March; some few may breed earlier, but they are exceptions to the general rule, and eggs taken later are generally much incubated.

I took eggs on the 13th and 27th February, and again on the 1st March.

The nests are solitary, and are huge structures, composed of stout twigs, lined with smaller twigs and leaves, and are generally built in forks of Peepul or other large trees. The egg, there is only one, is oval in shape, measuring 3.52 inches in length by about 2.6 inches in breadth; the texture is fine, and the shell is very strong. The egg lining is green, but the egg itself is glossless white.

5.—*Pseudogyps bengalensis* : LATH.

The Indian White-backed Vulture breeds much earlier than the King Vulture. I found my first nests on the 9th November, but as three eggs out of five taken on that date contained fully-formed chicks, eggs must have been obtainable much earlier.

They build in colonies, sometimes as many as twenty nests being found on the same tree, and these are at various heights, some being not more than 10 feet from the ground, while others are placed at almost the top of the tree.

Mr. Hume believed that January was the month in which most eggs were laid, but in Neemuch all those I found in December were much incubated, and many eggs had hatched out, so that November in this part of the country would appear to be the best month for nesting. I have never found more than a single egg in any

one nest, and this averages somewhat smaller than that of the King Vulture, *viz.*, 3.25 inches in length by about 2.4 in breadth. It is rather coarser in texture. Some eggs are white, but many of them are spotted and blotched with pale reddish brown. The egg lining is a deep green. They are generally much discolored by the droppings of the sitting bird.

6.—*Neophron ginginianus* : DAUD.

The White Scavenger Vulture breeds about the end of March or commencement of April. The nests are solitary, and are placed in very different situations, on cornices of buildings, edges of rocky or clayey cliffs, and commonly on trees; when in the latter situation, they are not usually built in forks, but are placed on large horizontal branches, or at the junction of a limb with the trunk.

The nest is a large, loose, ragged affair, lined with old rags. The eggs, two in number, are broadish, oval in shape, of a greyish white colour, beautifully streaked, blotched, and clouded with reddish brown. Some are so richly marked as to leave little of the ground colour visible, while others are comparatively plain. They measure 2.62 inches in length by 1.96 in breadth.

11.—*Falco jugger* : I. E. GR.

The Juggur Falcons breed from the latter end of January to the end of February. They nest indifferently on trees, edges of cliffs, and old buildings; they often appropriate the old nest of a tawny or other eagle. The nest is rather large, cup-shaped if built on a tree, loose and straggling if on a cliff. The eggs, usually four in number, occasionally five, sometimes only three, are nearly perfect ovals in shape, chalky in texture, of a dingy yellowish brown colour, clouded, mottled, and blotched with reddish brown. They measure 2 inches in length by about 1.58 in breadth.

16.—*Falco chiquera* : DAUD.

The Turumti or Red-headed Merlin breeds during March and the early part of April. The nest is neat, compact, and cup-shaped, and is composed of twigs lined with grass roots. All the nests I have found have been in shady trees, such as Peepul or Banian, and have been fairly well concealed. The eggs, four in number, are exact miniatures of those of the Juggur Falcon. They measure 1.66 inches in length by about 1.26 in breadth.

23.—*Astur badius* : GM.

The Shikra breeds during April. It takes a very long time to make its nest. I watched a pair for upwards of a month. To-day

they would place a few sticks on the nest and to-morrow they would remove them, arranging and re-arranging and taking an infinite deal of trouble, and the result was a nest that would disgrace even a crow. The nests are always built in forks of trees. The eggs, four in number (sometimes only three), are oval in shape, and are of a pure very pale, bluish white colour. They measure 1·54 inches in length by about 1·23 in breadth.

29.—*Aquila vindhiana* : FRANK.

The Indian Tawny Eagle commences to breed about the end of November and nests may be found quite up to the commencement of the hot season, but December and January are the months in which most eggs are laid. The nest is a large structure, composed of stout twigs, lined with green leaves, and it is invariably built upon a high tree. The eggs, two in number, are broadish oval in shape, but are subject to much variation. They are white in colour, more or less spotted and blotched with brown, reddish-brown, and occasionally purple ; they are generally discoloured. The egg lining is sea-green. They measure 2·65 inches in length by about 2·11 in breadth.

38.—*Arcaëtus gallicus* : GM.

I have never succeeded in obtaining an egg of the short-toed eagle, but early in March a native, who often accompanies me in my nesting rambles, reported that he had found a nest on a high tree, with one egg in it. As soon after as convenient, I accompanied him to the spot. There was the nest sure enough, but the egg was gone; the parent birds were hovering round the nest, but they never laid again. The native described the egg as being quite white.

42.—*Haliaëtus leucoryphus* : PALL.

The Ring-tailed Fishing Eagle is another bird whose eggs I failed to procure at Neemuch. I found a nest just finished, at the Panghur Lake, in December, and doubtless I should have obtained eggs had I gone a fortnight later, but the distance was so far, and the road so vile, that I did not think it worth while, as I had a series of eggs which I procured in Sind.

48.—*Butastur teesa* : FRANKL.

The Teesa or White-eyed Buzzard breeds during April. The nest, a rather loose, cup-shaped structure, composed of twigs, unlined, is generally placed in a fork in a mango or other thick foliaged tree. The eggs, three (occasionally four) in number, are broadish ovals in shape, and are delicate pale bluish—or greyish-white in colour, quite

devoid of markings. They measure 1·83 inches in length by about 1·54 in breadth.

56.—*Milvus govinda* : SYKES.

The Pariah Kite breeds from early in September quite up to the end of March. I cannot understand how this fact has escaped record, but even Mr. Hume seems to think that Christmas day was an early date to obtain eggs. I have found nests at Abu, Deesa, Hyderabad, Mhow, Poona, Neemuch, and even at Saugor, where I am now stationed, in September. The nest is usually built in a fork, but is sometimes placed on a flat bough. The eggs, two in number (occasionally three), are oval in shape, greyish-white in colour, more or less spotted, streaked, blotched, speckled or clouded with brown and purplish or reddish-brown. Some of the eggs are bright and handsomely coloured, with the markings clearly defined, but others are smudgy and dingily coloured. The nests are more abundant in October and January than at other times, and from this I am led to believe that they have two broods in a year. The egg lining varies from light to deep green, and the eggs average 2·2 inches in length by about 1·78 in breadth.

69.—*Bubo bengalensis* : FRANKL.

The Rock horned Owl breeds during March and April. It makes no nest, the eggs being placed on ledges and in recesses of cliffs, overlooking water. The eggs, three or four in number, are broad oval in shape, and white in colour, with just a perceptible creamy tinge. They average 2·1 inches in length by about 1·73 in breadth.

70.—*Bubo coromandus* : LATH.

The Dusky horned Owl breeds during December and January. They build a large stick nest on trees, which they use for successive seasons, but occasionally they make use of an old Vulture or Eagle's nest. It is usually lined with green leaves. The eggs, usually two in number, vary much both in shape and size, but they are generally broadish oval in shape, and average 2·33 inches in length by about 1·9 in breadth. They are creamy white in colour, and somewhat glossy but coarse in texture.

76.—*Carine brama* : TEM.

The Spotted Owlet breeds from the middle of February to the commencement of April. It nests in holes, and it appears to be a matter of indifference to it whether it be a hole in a tree, a building, a well, an old hay-stack, or even in a rocky cliff. A few leaves and feathers suffice for a nest. The eggs, usually four

in number, are oval in shape, and when fresh and unblown are of a delicate pink tinge, but are glossless white when much incubated. They measure 1.25 inches in length by about 1 in breadth. I have often found two pairs of birds using the same hole, and fresh and incubated eggs are often found together.

84.—*Hirundo filifera* : STEPH.

The Wire-tailed Swallow, to my thinking the handsomest of the Hirundines, breeds from the latter part of February to April, and again in August and September. The nest, composed of pellets of mud, is lined just with a few grass roots, and then with a plentiful supply of soft feathers. The nest is deep saucer-shaped, and is placed under the cornice of a bridge, in a niche in a well, under a culvert, or even under a projecting cliff, always near water. The eggs, three in number, are longish ovals pointed at one end, of a glossy white colour, richly speckled with different shades of reddish brown. They average 0.72 inches in length by about 0.53 in breadth. If the eggs are taken when fresh, the birds will lay a second, and if these are taken, a third batch in the same nest.

85.—*Hirundo erythropygia* : SYKES.

The Red-rumped Swallow breeds during the months of June and July. The nest, composed of pellets of mud, lined with feathers, is retort-shaped, and is usually built under bridges or culverts, but I found one nest under a stone slab, projecting over a well. The eggs, three in number, are pure white ovals, measuring 0.79 inches in length by about 0.56 in breadth.

89 — *Cotyle sinensis* : I. E. GR.

The Indian Sand Martin breeds during February and March in holes in banks. These holes, from two to three feet deep according to the nature of the soil, are excavated by the birds themselves. The nest, composed of grass, is well lined with soft feathers, and contains generally three pure white oval eggs, measuring 0.68 inches in length by 0.48 in breadth.

90.—*Ptyonoprogne concolor* : SYKES.

The Dusky Crag Martin breeds during March and April, and again in July and August. The nest, composed of pellets of mud, well lined with feathers, is deep saucer-shaped, and is generally affixed to the side of a house, under shelter of the eaves. The eggs, three in number, are white, spotted and blotched with red and yellowish brown. They measure 0.72 inches in length by about 0.52 in breadth.

100.—*Cypsellus affinis* : I. E. GR.

The Common Indian Swift breeds, I believe, all the year round. The nests are placed under the roofs of verandahs, stables, and such like places, and are composed principally of feathers agglutinated together with saliva. The shape depends altogether on the place in which it is : if in a hole, the nest fits all round it, and necessarily takes its shape ; sometimes it is placed between two rafters, and when these are close together, the nest is long and narrow. Sometimes the nests are isolated, but generally they are built in clusters or congeries. They almost always breed in company. The eggs, three in number, vary much in shape, but are normally very long narrow ovals. They are dead white without any spots. They average 0·87 inches in length by about 0·56 in breadth.

The roof of the verandah of the house in which I lived at Nee-much was literally covered with their nests, so that I had ample opportunities for observing them ; and I believe that there were eggs and nestlings in some or other of them the whole year through.

114.—*Caprimulgus monticolus* : FRANKL.

I found two eggs of Franklin's Night Jar on the 15th June. They were deposited on the bare ground under the scant shelter afforded by a small tuft of grass. They are longish oval in shape, and are of a pinkish cream colour, spotted and blotched with pale brown and faint purple. They measure 1·21 inches in length by 0·84 in breadth.

117.—*Merops viridis* : LIN.

The Common Indian Bee-eater breeds during April. They excavate holes in the banks of nullahs, from two to four feet in extent, according to the nature of the soil. The eggs, four in number, are deposited in the bare soil ; they are nearly spherical in shape and are glossy milk-white in colour. They measure 0·78 inches in length by 0·69 in breadth.

I have often found eggs in the same hole in different stages of incubation.

123.—*Coracias indica* : LIN.

The Indian Roller or Blue Jay breeds during April and May in holes in trees, old walls, or under the eaves of houses. A little grass and a few feathers suffice for a nest. The eggs, four in number, are nearly spherical in shape, and measure 1·3 inches in length by about 1·1 in breadth. They are china-white in colour, and are highly glossy.

129.—*Halcyon smyrnensis* : LIN.

The White-breasted Kingfisher breeds from early in March to the end of May, or even later. It excavates a hole in a river bank, or even in the side of a well. There is no nest. The eggs, five in number (occasionally six), are placed on the bare soil. They are almost spherical in shape, averaging 1.12 inches in length by about 1 in breadth. They are glossy china-white when first laid, but as incubation proceeds, this fades and they become glossless white, and are often discolored.

134.—*Alcedo bengalensis* : GM.

I found but one nesting hole of the little Indian Kingfisher ; this was in March, and it contained five unfledged young ones and an addled egg. The egg was nearly spherical in shape, and when fresh must have been of a glossy china-white. It measured 0.79 inches in length by 0.68 in breadth.

136.—*Ceryle rudis* : LIN.

The Pied Kingfishers breed from February to April, unlike the White-breasted Kingfisher. They never make their holes in the sides of wells, but always in river banks over running water. These holes are of great extent, one that I examined extending to quite five feet. The eggs, from four to six in number, are broad ovals, occasionally almost spherical. They are pure china-white when blown, and are highly glossy. They measure 1.2 inches in length by about 0.91 in breadth.

148.—*Palæornis torquatus* : BODD.

The Rose-ringed Paroquet breeds from the end of February to early in April. It nests in holes, generally in trees, but occasionally in buildings and old walls. The eggs, usually four in number, are broadish ovals in shape, pointed at one end, and are of a pure glossless white. They measure 1.22 inches in length by about 0.95 in breadth.

197.—*Xantholæma hæmacephala* : P. L. S. MULL.

The Coppersmith begins to breed in February, and eggs may be found quite up to the middle of April, but most of them are laid in the commencement of March. They select a branch decayed internally, and into this they cut a small circular hole ; there is no nest. The eggs, three or four in number, are long, narrow, pure white ovals, measuring 1 inch in length by about 0.7 in breadth.

212.—*Coccytes jacobinus* : BODD.

I never obtained an egg of the Pied-crested Cuckoo at Neemuch that I could be quite sure of, but then the bird is comparatively



rare, but at Mhow, where the bird literally swarms during the monsoon, I obtained an egg extracted from the oviduct of a female.

214.—*Eudynamis honorata* : LIN.

The Koel lays her eggs in nests of the Common Crow, usually one egg in a nest, occasionally two, but I once found three, but as these eggs differed from each other, I am inclined to think they must have been the produce of different birds. I have never found the Crow eggs broken. The eggs vary much both in colour and size, pale sea-green, oily-green, dull olive-green and dingy stone-coloured varieties all occur, and the markings are olive or reddish brown and dull purple. They average 1.2 inches in length by 0.92 in breadth.

217.—*Centrocoryx rufipennis* : ILL.

The Crow Pheasant or Coucal breeds from May to July, or even later. It builds a large, irregular, domed, globe-shaped nest, composed of twigs and coarse grass, lined with leaves. The nest is placed in the centre of a thorny thicket or tree. The eggs (I have never found more than three) are broad, white, chalky ovals, measuring 1.43 inches in length by about rather less than 1.17 in breadth.

234.—*Cinnyris asiatica* : LATH.

The Common Purple Honeysucker commences to breed in March, and nests may be found quite up to the beginning of the rains. The nest is pendant-shaped, something like a Florence flask, or oval with a tapering neck. This is suspended from the end of a slender branch or twig. All sorts of material are made use of in constructing the nest: fibres, cobwebs, hair, fine grass, bits of straw, lichens, dead leaves, flower petals, pieces of rag, &c., are all pressed into service and are neatly and compactly woven together. It is well lined with soft vegetable down. The nest at a short distance resembles one of the bunches of cobwebs, so commonly met with on trees and bushes. The entrance, which is on one side, about half way up, is shaded by a canopy, beautifully adapted to keep out the rains. The eggs, two or three in number, are dingy little ovals. The ground colour is greenish or greyish-white, usually almost obscured by greyish-brown or purplish-grey ill-defined markings. They average 0.64 inch in length by about 0.46 in breadth.

256.—*Lanius lahtora*: SYKES.

The Indian Grey Shrike breeds from March to early in July, but the favorite month seems to be April, as I have found many more nests in that month than in any other. The nest is generally placed

in the centre of a thorny bush or small tree, and is composed of various materials, such as thorny twigs, coarse grass, pieces of rag, &c., which form the body of the nest, while the interior is lined with fine grass, hair, and the like. The eggs, usually four in number, are broad oval in shape, pointed at one end, and are greenish-white in colour, with brown and purple markings; sometimes these are ill defined, but occasionally they stand out clear and distinct, and not seldom form an irregular zone at the larger end. They measure 1.05 inches in length by about 0.8 in breadth.

257.—*Lanius erythronotus*: VIG.

The Rufous-backed Shrike breeds from June to August. The nest is similar to that of *L. Lahtora*, but is perhaps, as a rule, more compactly built. The eggs, too, are similar in all respects except size, measuring 0.92 inch in length by rather more than 0.7 in breadth.

260.—*Lanius vittatus*: VALENC.

The Bay-backed Shrike breeds from March to July. The nest, placed in a fork of a small babool tree, is deep cup-shaped, neatly and compactly built, and is composed of fine twigs, grass roots, &c., lined with feathers and fine grass. The eggs, four in number, are broad ovals in shape, and are of a pale greyish or greenish-white colour, with an ill-defined zone of brownish and purplish spots at the larger end with a few spots of the same colour scattered over the remaining surface. They measure 0.83 inch in length by about 0.65 in breadth.

276.—*Pericrocotus peregrinus*: LIN.

The Small Minivet breeds during July and August. The nest is small, neatly and compactly built, of a deepish cup-shape, and is generally located in a fork of a branch of a tree at some height from the ground. It is composed of fine twigs bound together with cobwebs, and so closely resembles the bark of the tree, that it looks like a mere knot or excrescence; there is very little lining. The eggs, three in number, are rather broadish ovals, of a pale greenish-white colour, speckled, spotted and blotched with bright brownish-red. They measure 0.66 inch in length by about 0.53 in breadth.

278.—*Buchanga atra*: HERM.

The King Crow breeds during May and June. A few nests may be found in July, but by far the greater number are to be found during the latter part of May and the commencement of June. The nests are built in forks at the extremities of branches, generally at

some considerable height from the ground. They are strongly but slightly made, so much so, that the contents of the nest can be seen from below ; they are composed of grass stems and roots neatly interlaced. The eggs, four in number, are glossless white with numerous spots and specks of rusty red and reddish-brown; occasionally the eggs are of a deepish salmon tint, the spots and specks being brownish-red. I have never found a pure white egg. They measure one inch in length by about three quarters of an inch in breadth.

288.—*Muscipeta paradisi* : LIN.

The only nest of the Paradise Flycatcher that I found was in June, and it was not quite finished. I sent a shikaree a week later to examine it, when it contained a single egg which he brought in; it measures 0·8 inch in length by 0·6 in breadth, and is an exact miniature of a richly coloured King Crow's egg.

292.—*Leucocerca aureola* : VIEILL.

The White-browed Fantail breeds from the latter part of February to the commencement of August, but most nests are found in March and July, and from this I infer that they have two broods in the year. The nest is usually placed on the upper surface of a horizontal branch; it is round and cup-shaped, rather deep, and is composed of fine grass roots, tightly bound with cobwebs, and is a very beautiful nest, not much bigger than the top of a wine-glass. The eggs, three in number, are little buffy ovals, with a nimbus or belt of spots round the middle. They measure 0·66 inch in length by about 0·5 in breadth.

385.—*Pycioris sinensis* : GM.

The Yellow-eyed Babbler breeds from July to September. The nests are placed either in small forks in trees, or between the stalks of growing corn or sedges. When in the former situation, the nest is deep cup-shaped, but in the latter it is more cone-like, the bottom of the nest being frequently prolonged to a point. The nest is very handsome, and is composed of broad-leaved grasses, strips of bark, vegetable fibres and cobwebs. The eggs, four in number, vary much in colour, some being white with bold hieroglyphic blotches of rusty red and reddish-brown; others are pinkish-white, but so closely stippled and streaked with bright brick-dust red as to leave little of the ground colour visible. Every possible combination of these two types is to be met with, but all the eggs in a nest are of the one kind. In shape they are broadish ovals, but here again considerable

variations occur. They measure 0·73 inch in length by about 0·6 in breadth.

432.—*Malacocercus terricolor* : HODGS.

I only came across one undoubted nest of the Bengal Babbler. This was in April, and it contained four eggs. Both nest and eggs are absolutely indistinguishable from those of a *Malcolmi*.

436.—*Argya malcolmi* : SYKES.

The Large Grey Babbler is very common, and I have found nests in each month from January to December. They have, I believe, several broods in the year, and even when nesting associate in small parties of seven or eight. The nests, composed of grass roots, are loosely but neatly woven together, and are placed amongst the smaller branches of babool trees, at no great height from the ground. The eggs, four in number, are rather broadish ovals, of a very glossy greenish-blue colour. They measure 1 inch in length by about 0·78 in breadth.

438.—*Chalarrhæa caudata* : DUM.

The Striated Bush Babbler breeds from March to July. The nest is usually placed in a low thorny bush, and is composed of grass roots and stems ; it is deep cup-shaped, neatly and compactly built. The eggs, three or four in number, are longish ovals, slightly compressed at one end, and are of a pure, pale, spotless, blue colour. They measure 0·85 inch in length by about 0·64 in breadth.

462.—*Molpastes hæmorrhous* : GM.

The Common Madras Bulbul breeds from April to September. Nests are occasionally found even earlier than this, but they are exceptions to the general rule. The nest is usually placed in a fork in a bush or small tree, and is of a neat cup-shape, composed of grass, roots, &c., lined with hair, fine grass and fibres. The eggs, three or four in number, are normally longish ovals, slightly pointed at one end, and vary very much in colour. One type is pinkish white, thickly speckled and stippled more or less over the whole surface with blood red ; in another type, the ground colour is pink with large blotches of deep red and smaller ones of inky-purple. Between these two types almost every combination occurs. They measure 0·9 inch in length by about 0·65 in breadth.

468.—*Iora tiphia* : LIN.

The White-winged Green Bulbul or Iora breeds at Neemuch in April and August. I only found two nests : one in April contained three unfledged nestlings, and the other in August contained three

fresh eggs. In both instances the nests were placed in forks of guava trees, and were neatly and strongly yet slightly built, composed of grass roots and fibres bound together with cobwebs. The eggs are broadish ovals in shape, and are creamy white in colour, with long streaks of purplish and yellowish-brown. They measure 0·69 inch in length by 0·55 in breadth.

470.—*Oriolus kundoo* : SYKES.

The Indian Oriole breeds during July and August. The nest, pocket-shaped, is suspended between a fork at the extremity of a branch of a large tree. It is composed of grass and roots, bound round the twigs forming the fork with strips of bark ; it is lined with fine grass. The eggs, three in number, are longish ovals, pointed at one end, and are of a beautiful glossy china white colour, with clearly defined, deep, blackish-brown spots. They measure 1·1 in inches length by about 0·8 in breadth.

475.—*Copsychus saularis* : LIN.

The Magpie Robin breeds during April and May. The nests are placed in holes in trees or old stone walls, and are often mere pads, with a depression in the centre for the reception of the eggs, and are composed of roots, grass, hair, &c. The eggs, four in number, are moderately broad ovals, pointed at one end, and are bluish or greenish-white in colour, speckled and spotted with different shades of reddish-brown. They measure 0·81 inch in length by about 0·67 in breadth.

480.—*Thamnobia cambaiensis* : LATH.

The Northern Indian Robin breeds from March to the middle of July. The nest is placed in a hole in a tree or stone wall, under a bank or the eaves of houses, and such like places, and is generally a mere pad, composed of roots, grass, hair, leaves, feathers, &c. The eggs, four in number, are oval in shape, pointed at one end, and are pale greenish-white in colour, speckled and spotted with different shades of reddish-brown.

494.—*Cercomela fusca* : BLYTH.

The Brown Rock Chat breeds from March to the end of July, rearing, I believe, two or three broods in the season. The nests, which are mere pads of grass roots and hair, are placed in holes in stone walls, in clefts in rocks, and under banks. The eggs, three or four in number, are broadish ovals pointed at one end, and are of a pure, pale, blue colour, with spots and specks of red and reddish-brown, chiefly confined to the larger end, where they often form a belt. They measure 0·82 inch in length by about 0·62 in breadth.

530.—*Orthotomus sutorius* : FÖRST.

The Indian Tailor Bird breeds from July to the end of September. The bird selects a largish leaf and manages to fasten the edges together by a few shreds of cotton, and in the cavity thus formed it constructs a nest, composed almost exclusively of cotton, with only just sufficient hairs in it to give it elasticity and to keep it in shape. This is the most common type of nest, but often they sew two or more leaves together. The eggs, three in number, are longish ovals, generally whitish with a few blotches of bright rusty red. Occasionally the eggs are pale greenish-white with the rusty red markings less bright. They measure 0·64 inch in length by about 0·45 in breadth.

534.—*Prinia socialis* : SYKES.

The Ashy Wren Warbler breeds about the same time and in a somewhat similar manner to the Tailor Bird, but the nest is not so neatly made, and grass and fibres are oftener used in its construction. The eggs, four in number, are broadish ovals of a glossy brick red or mahogany colour. They measure 0·64 inch in length by about 0·47 in breadth.

535.—*Prinia stewarti* : BLYTH.

Stewart's Wren Warbler breeds in a precisely similar manner to the Ashy Wren Warbler, and I could discover no constant difference either in the shape, size, or colour of the eggs.

543.—*Drymæca inornata* : SYKES.

The Earth-brown Wren Warbler breeds during the monsoon, that is, from July to the end of September. A favourite site for a nest is under the broad leaf of a shrub that grows very commonly in the district. It constructs a purse-shaped nest, with fine shreds or strips of grass. The leaf which forms a roof to the nest is pierced through and through with these shreds, and here and there a strip of grass is fastened to an adjoining leaf or stalk. Another common type of nest is formed by attaching strips of grass to thorny twigs, so as to form a sort of framework, and then carefully weaving other strips between them, the nest necessarily taking the shape of the framework. Another kind of nest is simply a rather less neatly woven purse, attached to the stems of growing corn or sedges. The nest is never lined. The eggs, four, sometimes five, in number, are oval in shape, and glossy pale greenish-blue in colour, with blotches and spots of deep chocolate and reddish-brown, and an intricate tracery of closely interlaced delicate lines round the large end ; occasionally these lines are absent. They measure 0·6 inch in length by about 0·45 in breadth.

545.—*Drymæca sylvatica* : JERD.

The Jungle Wren Warbler breeds during the monsoon, making a globular nest of grass and fibres. The eggs, four or five in number, are of two distinct types, pale greenish-white with very close but minute specks of rusty red, and white with similar markings. They measure 0·69 inch in length by about 0·5 in breadth.

551.—*Franklinia buchanani* : BLYTH.

The Rufous-fronted Wren Warbler breeds during July, August, and the early part of September. The nest, composed of grass, is loosely constructed, and is placed in low bushes or scrub. The eggs, five in number, are broadish oval in shape, white in colour (tinged bluish), thickly and finely speckled with dingy red. They measure 0·61 inch in length by about 0·48 in breadth.

589.—*Motacilla maderaspatensis* : GM.

The Pied Wagtail breeds during March, April and May. The nest is a mere pad of grass, roots, hair, &c., placed in a hole in a wall or well, on a rocky or earthy ledge, or anything solid, but always in the vicinity of water. The eggs, three or four in number, are broadish oval in shape, pointed at one end, and are greenish or earthy-white in colour, with dingy brown markings. They measure 0·9 inches in length by about 0·65 in breadth.

660.—*Corvus macrorhynchus* : WAGL.

The Bow-billed Corby breeds from the latter end of February to about the middle of April, making the usual corvine stick nest. The eggs, four in number, are moderately broad ovals in shape, and are greenish-blue in colour with spots, streaks, and dashes of sepia, blackish and olive-brown. They measure 1·73 inches in length by about 1·19 in breadth.

663.—*Corvus splendens* : VIEILL.

The Ashy-necked or Common Indian Crow breeds during May and June. The eggs are of the usual corvine type, but are much smaller than those of the Corby, measuring 1·4 inches in length by about 0·98 in breadth.

684.—*Acridotheres tristis* : LIN.

The Common Myna breeds during June and July. A favourite spot for a nest is on the top of a pillar, in a verandah, just under the roof, but holes in trees and walls are not neglected. The nest is a mere collection of fine twigs, roots and grasses. The eggs, four or five in number (quite as often one as the other), are longish ovals in shape, and unspotted greenish-blue in colour. They measure 1·2 inches in length by about 0·86 in breadth.

685.—*Acridotheres ginginianus* : LATH.

The Bank Myna breeds in holes, made by themselves, in river banks, about May. The eggs, four in number, are counterparts of those of the Common Myna, but are smaller. They measure 1·05 inches in length by about 0·87 in breadth.

687.—*Sturnia pagodarum* : GM.

The only nest of the Brahminy Myna that I found was in June ; it was in a hole in a tree, and contained three fresh eggs. They are longish ovals in shape, and are of a pale greenish-blue colour, and measure 0·97 inches in length by about 0·73 in breadth.

694.—*Ploceus philippinus* : LIN.

The Baya or Weaver Bird commences to breed about the latter end of July, that is, when the rains have set in ; it is a gregarious builder, as many as forty nests being frequently counted upon one tree, which is usually a thorny babool, growing over water, river, tank or well, it does not matter which, thus obtaining greater protection. The nests are retort-shaped, and are composed of strips of grass, ingeniously interwoven ; the grass is always used green. They commence operations at the extreme end of a slender twig, and for the first few inches the nest is solid, gradually increasing in size. After about a foot of the nest is made, they commence to form a receptacle for the eggs on one side and a tubular entrance opposite, a strong loop being made across the nest to form the division. The egg compartment is about seven inches in length by six in breadth and four and-a-half in width, but they vary much. The above dimensions are of a very fine nest. The tubular entrance is generally five or six inches in length, but as the male bird goes on increasing the length during the time the female is sitting, it often reaches an almost incredible length. I have seen one measuring sixteen inches. I am puzzled as to what the ordinary number of eggs is. I have often found two eggs, much incubated ; many times I have met with four, and on one occasion I took seven from the same nest. The eggs are moderately long ovals, pointed at one end, and are dull white in colour. They measure 0·82 inches in length by about 0·59 in breadth.

695.—*Ploceus manyar* : HORS.

The Striated Weaver Bird breeds about the same time as its relative *P. Philippinus*. The nest is very similar, but instead of being affixed to the end of a bough, it is fastened to the top of a



bunch of reeds growing in water. The eggs are much like those of *P. Philippinus*, but are rather smaller.

703.—*Amadina malabarica* : LIN.

I have found nests of the Pintail Munia throughout the year. They are usually placed in low thorny bushes, but they are very variable in the site they select. I once found a nest under the eaves of an out-house, and not unfrequently they make their nests in the sticks forming the foundation of a Kite's nest. The eggs, pure white in colour, vary from 5 to 9 in number, but I am inclined to think that occasionally more birds than one lay in the same nest. They measure 0·6 in length by about 0·47 in breadth.

704.—*Estrellda amandava* : LIN.

I found but a single nest of the Red-waxbill, and it contained four half-fledged nestlings. This was in October.

706.—*Passer domesticus* : LIN.

The House Sparrows breed from February to August, and are quite a nuisance the while ; no amount of persecution seems to deter them from building in a place when once they have made up their minds to it.

711.—*Gymnoris flavirostris* : FRANKL.

The Yellow-throated Sparrow breeds during April and May in holes in trees. The eggs, four in number, are much smaller and darker than those of *Passer domesticus*. They measure 0·74 in length by 0·54 in breadth.

756.—*Mirafra erythroptera* : JERD.

The Red-winged Bush Lark breeds from March to September. I am inclined to think that it has two broods in the year, as nests are much more commonly found in March and April, and again in August and September. The nest is built upon the ground, under the shelter of a tussock of grass, and is composed of grass stems and roots. The eggs, four in number, are oval in shape, and are of a greenish-white colour, speckled and spotted with various shades of reddish and yellowish-brown. They measure 0·78 inches in length by about 0·6 in breadth.

757.—*Mirafra cantillans* : JERD.

The Singing Bush Lark is decidedly rare at Neemuch, and I only succeeded in finding one nest, which was in September. This was similar to that of the Red-winged Bush Lark as regards locality and

material, but was more perfectly domed over. The eggs, four in number, were much incubated. They measured 0·78 inches in length by about 0·6 in breadth.

758.—*Ammomanes phoenicura*: FRANKL.

The Rufous-tailed Finch Lark breeds during March and April; the nest is a mere circular pad, placed in a cavity under a clod of earth, and is composed of grass roots, scantily lined with a few hairs; the eggs, usually three in number (I once found four), are very variable in size, shape and color, but are usually longish ovals, measuring 0·85 inches in length by about 0·62 in breadth, and are usually yellowish-white in color, with specks and spots of reddish or yellowish-brown.

760.—*Pyrrhuloxia grisea*: SCOP.

I found nests and eggs of the Black-bellied Finch Lark in each month throughout the year, with the exception of July and August. The nest, which is a soft pad, with a depression for the eggs, is placed in a footprint or slight hollow in the ground, under the shelter of a clod of earth or tussock of grass. The eggs, two in number, occasionally three, are moderately long ovals, of a dingy or greyish-white color, thickly speckled, sprinkled and spotted with yellowish-brown. They measure 0·73 inches in length by about 0·55 in breadth.

765.—*Spizaloxia deva*: SYKES.

The Southern Crown-crest Lark breeds during July, August and September; the nest is placed on the ground in the centre of, or under the shelter of, a tussock of grass, and is composed of grass roots and fibres; it is of a shallow cup-shape. The eggs, two or three in number, quite as often one as the other, are oval in shape, pointed at one end, and are of a dingy white colour, profusely spotted and speckled with yellowish and earthy brown. They measure 0·86 inches in length by about 0·63 in breadth.

767.—*Alauda gulgula*: FRANKL.

The Indian Sky-lark breeds during the month of July, possibly both earlier and later, but July is the only month in which I have obtained eggs. The nest, composed of fine grass, is placed in a depression in the ground, and the eggs, three or four in number, are moderately broad ovals, of a dingy or greyish-white colour, spotted and speckled with yellowish-brown and purplish-grey. They measure 0·8 inches in length by about 0·6 in breadth.

773.—*Crocopus chlorigaster* : BLY.

I found the Southern Green Pigeon breeding in March. The nest, which was of the usual stick type, contained two pure white eggs. They were much incubated, but were still highly glossy. They measured 1.2 inches in length by 0.9 in breadth.

788.—*Columba intermedia*, BRICKL.

By far the favourite site for the nest of the Indian Blue Rock Pigeon is in holes in masonry wells.

794.—*Turtur senegalensis* : SMIL.

The Little Brown Dove breeds throughout the year ; it shows a decided preference for prickly-pear bushes, as I found twenty nests in them to one elsewhere. The eggs average an inch in length to about 0.84 in breadth.

795.—*Turtur suratensis* : GM.

The Spotted Dove has not such an extensive breeding season as the Little Brown Dove ; indeed, I have only found nests in September. The eggs measure 1.1 inch in length by about 0.85 in breadth.

796.—*Turtur risorius* : LIN.

The Common Ring Dove breeds from October to July ; at least I have taken eggs in each of these months, but I believe that had I searched, I should have found them during the remaining months. The eggs measure 1.15 inches in length by about 0.92 in breadth.

797.—*Turtur tranquebaricus* : HERM.

I only found nests of the Ruddy Ring Dove in November, so that its breeding season seems much more restricted than is generally the case with doves. The bird is not common, and is very locally distributed. The eggs measure 1.01 inches in length by about 0.8 in breadth.

800.—*Pterocles fasciatus* : SCOP.

I was very unfortunate in not obtaining eggs of the Painted Grouse. The birds are by no means uncommon, and I have frequently obtained young ones.

802.—*Pterocles exustus* : TEM.

The Common Sand Grouse has a very extended breeding season, as I have found eggs from January to June. They are three in number, and are placed in a depression in the soil, and are of a long cylindrical shape, equally rounded at both ends. They are of a

greenish-stone colour, spotted, streaked, clouded and blotched, olive-brown and pale inky purple. They measure 1.45 inches in length by about an inch in breadth.

803.—*Pavo cristatus* : LIN.

The Pea-fowl breeds during August and September, when the rains are at their height. The eggs, six or seven in number, are laid in a depression in the soil (scratched by the hen), scantily lined with a few grass stems or leaves. They are broadish ovals, slightly pointed at one end, and are creamy-white or pale cafe-au-lait in colour, pitted all over like a Guinea-fowl's egg. They measure 2.75 inches in length by about 2 in breadth.

814.—*Galloperdix spadiceus* : VAL.

The Red Spur Fowl breeds during June and July, and probably earlier, as I saw a brood of chicks early in July that must have been hatched in the beginning of June. The nest is very slight, placed in a depression in the ground, scratched by the hen herself. The eggs, from four to six in number, are miniatures of those of the domestic fowl. They measure 1.6 inches in length by about 1.2 in breadth.

819.—*Francolinus pictus* : JAR. & SEL.

The Painted Partridge lays after the rains have well set in, *viz.*, about August and September. The nest is a very loosely made pad, placed in a depression in the ground. The eggs, six or seven in number, are peg-top shaped, and are of a smoky white colour. They measure 1.4 inches in length and about 1.15 in breadth.

822.—*Ortygornis pondiceriana* : GM.

The Grey Partridge breeds from the end of March to quite the middle of June. The eggs are occasionally found on the bare ground, but there is generally a more or less compact pad, placed in a depression in the ground under cover of a tuft of grass. The eggs, six to nine in number, are slightly elongated ovals, pinched in more or less at one end, and are of a slightly soiled white colour, and measure 1.3 inches in length by about 1 inch in breadth.

826.—*Perdica asiatica* : LATH.

The Jungle Bush Quail lays towards the end of the rains. I have never succeeded in obtaining eggs, but have many times flushed broods of chicks.

827.—*Perdicula argoondah* : SYKES.

The Rock Bush Quail breeds from August to December. They may commence earlier, but I have only found eggs in the months mentioned. The nest is placed in the ground generally under a clump of grass or shrub, and is composed of a few blades of grass. The eggs, six or seven in number, are much like those of the Grey Partridge, but are much smaller. They measure 1 inch in length by about 0·82 in breadth.

836.—*Eupodotis edwardsi* : GRAY.

The Indian Bustard is fairly common at Neemuch. I have an egg that was found on the bare ground under a tuft of Sarpat grass in July. This egg is of a dark olive brown colour, with a few streaks and smudges of a darker shade. It measures 3·1 inches in length by 2·25 in breadth.

839.—*Sypheotides aurita* : LATH.

The Likh or Lesser Florican does not breed until the rains have well set in, that is, not until September and October. There is no nest; the eggs, three or four in number, being deposited on the bare ground, under cover of a stunted bush or tussock of grass. They are broad oval in shape, and are of an olive green colour with reddish brown streaks and smudges. They measure 1·9 inches in length by 1·6 in breadth.

840.—*Cursorius coromandelicus* : GM.

The Indian Courser or Courier Plover breeds during March and April. There is no nest. The eggs, two or three in number, are deposited on the bare ground, under shelter afforded by a clod of earth or tussock of grass. Owing to their colour assimilating so closely to the ground on which they are placed, they are very difficult to find. The eggs are nearly spherical in shape, and are of a yellowish stone colour, closely spotted, speckled and lined with blackish brown, and having a few underlying clouds or smudges of pale inky grey. They measure 1·2 inches in length by 0·98 in breadth.

850.—*Egialitis minutus* : PALL.

The Lesser Ringed Plover breeds abundantly during March and April. There is no nest. The eggs, three in number, are placed on the sand, in the bed of a river; they are broad oval in shape, much pointed at one end, and are of a yellowish stone colour, thinly lined and spotted with blackish brown. They measure 1·2 inches in length by about 0·83 in breadth.

The anxiety exhibited by these little Plovers, when they have young, and their many devices to entice intruders away from their vicinity, quite equals anything recorded of the Lapwing. On the 17th April, while wandering on the banks of a nullah, my attention was arrested by the peculiar movements of one of these birds. It was lying on its side as if in death agony with its wings fluttering and quivering ; it would make an attempt to fly, but after proceeding a yard or two it would fall down headlong as if shot. Suspecting that it had eggs or young near, I made a diligent search, but could find nothing, the bird all the time accompanying me and making the most frantic efforts to distract my attention. I left off searching, but carefully watched the bird from a distance. After a short time it settled itself down, as a hen would squatting over chicks. I carefully marked the spot, made a sudden rush at it, and then on my hands and knees I carefully felt all round, and presently found a tiny fluffy chick, apparently stone dead. I thought that I must have stepped upon it and killed it. I felt very sorry, but all at once I saw the little beggar open one eye and take a look at me. I placed it on the ground, and taking my eye off of it for a moment, it disappeared ; and it was only after a long and painstaking search that I again found it, still apparently dead. I moved a few paces away and watched it. After a moment it opened its eyes, gave a slight stretch, and disappeared as if by magic. I found three broken egg shells close by, and they appeared as if the chicks had only just been hatched, and there must have been two others close by me, although they escaped my search.

855.—*Lobivanellus indicus* : BODD.

The Red-wattled Lapwing breeds from April to July. There is no nest. The eggs, four in number, are placed on the ground, almost always in the vicinity of water. They are broad oval in shape, much pointed at one end, or I should say a peg-top shape. They vary somewhat in colour, but are usually of a yellowish buff, blotched and streaked with reddish brown. They measure 1.64 inches in length by about 1.25 in breadth.

856.—*Lobipluvya Malabarica* : BODD.

The Yellow-wattled Lapwing breeds during April and May. There is no nest. The eggs, four in number, are deposited on the bare ground, without any attempt at concealment ; they are not partial to water, but frequent by preference bare sandy plains. The eggs are similar in shape to those of *Lobivanellus indicus*, but

are much smaller, only measuring 1.45 inches in length by 1.06 in breadth.

862.—*Grus antigone* : LIN.

The Sarus breeds freely during August and September, but I found two fresh eggs in February while duck shooting and two incubated in March, probably both these clutches belonged to birds that had had their first eggs accidentally destroyed. The eggs, two in number, are of an elongated oval shape, pointed at one end. They vary in colour, but are generally creamy white, more or less spotted and blotched with pale yellowish-brown and purplish-pink. They measure 3.9 inches in length by 2.55 in breadth.

873.—*Rhynchæa bengalensis* : LIN.

I found the Painted Snipe breeding in May. It probably breeds both earlier and later than this, but this was the only month in which I obtained eggs. They are broadish oval in shape, pinched in at one end, and are of a buffy colour, blotched and streaked with rich black brown. They measure 1.4 inches in length by 1 in breadth.

900.—*Metapodius indica* : LATH.

The Bronze-winged Jacana breeds during July and August, making a floating nest of weeds. The eggs (I never found more than four but then they were all fresh), are broad ovals, pointed at one end, and are generally of a rich cafe-au-lait colour, but are subject to considerable variation. One clutch I have is a dark olive brown, while another is a very pale stone brown. The eggs of this last clutch are abnormally small. The markings, consisting of a network of entangled lines, are very deep blackish brown. The eggs are highly glossy, and measure 1.47 inches in length by 1.02 in breadth.

901.—*Hydrophasianus chirurgus* : SCOP.

The Pheasant-tailed Jacana breeds during August and September. The nest is a floating one, composed of grass and aquatic plants. The eggs, four in number, are peg-top shaped, and are of a glossy rufous or greenish bronze. They measure 1.46 inches in length by about 1.1 inch in breadth.

902.—*Porphyrio Poliocephalus* : LATH.

The Purple Coot breeds during September. The nests, built of rushes and reeds, are floating but not free, and occasionally they rest upon the ground. The eggs, seven or eight in number, are broadish

ovals in shape, and are of a pale pinkish stone colour, thickly spotted and blotched with rich red brown and pale purple. They measure 1.93 inches in length by about 1.4 in breadth.

903.—*Fulica atra*: LIN.

I did not succeed in finding a nest of the Common Coot, but a native fisherman, who has often given me information regarding nests and eggs, and whom I have generally found reliable, reported that he had seen a batch of newly-hatched chicks in April. I was too busy at the time to go out, so could not verify his statement, but suspect that what he saw was a brood of the white-breasted Water Hen.

907.—*Erythra phœnicura*: PENN.

The White-breasted Water Hen breeds from May to August. All the nests I have found have been placed in the branches of dense bushes or trees close to water. The eggs, four in number, differ much in size, shape and colour. Eggs of the same clutch will even differ. The usual type is creamy white, with yellowish brown and light red spots and blotches, with apparently underlying markings of pale bluish gray. Some eggs I have are white with scarcely any markings. They are usually broadish oval in shape, and average 1.55 inches in length by about 1.18 in breadth.

930.—*Ardeola grayi*: SYKES.

The Indian Pond Heron breeds from June to August, generally in small colonies, but isolated nests not unfrequently occur. They are composed of sticks, and are of a platform shape. The eggs, four or five in number, are rather longish ovals, slightly pointed at one end, and are of a deep sea-green colour. They measure 1.48 inches in length by 1.17 in breadth.

938.—*Tantalus leucocephalus*: GMEL.

The Pelican Ibis breeds in colonies during March and April. The nests are small, rough platforms, composed of sticks, and are placed high up in lofty trees, often in the vicinity of villages. The eggs (I never found more than four, but they were fresh and probably the birds lay more) are elongated ovals, pointed at one end, and are of a dull unspotted white. They measure 2.77 inches in length by about 1.88 in breadth.

950.—*Sarcidiornis melanonotus*: PENN.

I have been very unfortunate with the Nukhtah, as I could never obtain an egg, but several times in September I have shot half-fledged young.



951.—*Nettapus coromandelicus* : LIN.

This is another bird whose eggs I have been unable to procure, although I have often seen the young.

952.—*Dendrocygna javanica* : HORS.

The Whistling Teal breeds during August and September. In Neemuch I have never found the nests on trees, but always amongst the sedges on the border of a tank. The eggs, six or seven in number, are broad oval in shape, and are milky white in colour. They measure 1·85 inches in length by about 1·49 in breadth.

959.—*Anas pæcilorhyncha* : CUV.

I have never succeeded in obtaining the eggs of this duck, but have often at the end of the rains shot the ducklings.

975.—*Podiceps minor* : GM.

The Dabchick breeds during September and October. The nest, a floating one, is composed of aquatic weeds and sedges. The eggs, four or five in number, are, when freshly laid, chalky white, but as incubation proceeds they become much stained, from the habit the bird has of covering her eggs with wet weeds when she leaves the nest. They are elongated ovals in shape, pointed at each end, and measure 1·39 inches in length by about 0·99 in breadth.

985.—*Sterna seena* : SYKES.

I found four eggs of the Large River Tern in the sandy bed of the river in May. They are broad ovals in shape, and are of a pale greenish-grey colour, blotched and streaked with brown, and having underlying clouds of a pale inky purple. They measure 1·65 inches in length by about 1·26 in breadth.

In addition to the above, of which I have either procured eggs or seen the young, the following birds must, I am sure, breed at Neemuch, as I have constantly noted them throughout the year :—

55.—*Haliastur indus* : Bodd.

57.—*Pernis ptilorhynchus* : Tem.

59.—*Elanus melanopterus* : Daud.

65.—*Syrnium ocellatum* : Lesson.

104.—*Dendrochelidon coronata* : Tick.

107.—*Caprimulgus indicus* : Lath.

144.—*Ocyrceros birostris* : Scop.

147.—*Palæornis eupatria* : Lin.

149.—*Palæornis purpureus*, P. L. S. Müll.

- 160.—*Picus mahrattensis* : Lath.  
 180.—*Brachypternus aurantius* : Lin.  
 219.—*Taccocua leschenaulti* : Less.  
 265.—*Tephrodornis pondicerianus* : Gm.  
 600.—*Corydalla rufula* : Vieill.  
 645.—*Parus nipalensis* : Hodgs.  
 647.—*Machlolophus xanthogenys* : Vig.  
 674.—*Dendrocitta rufa* : Scop.  
 696.—*Ploceus bengalensis* : Lin.  
 830.—*Coturnix coromandelica* : Gm.  
 832.—*Turnix taigoor* : Sykes.  
 834.—*Turnix joudera* : Hodgs.  
 835.—*Turnix dussumieri* : Tem.  
 905.—*Gallinula chloropus* : Lin.  
 908.—*Porzana akool* : Sykes.  
 917.—*Xenerhynchus asiaticus* : Lath.  
 923.—*Ardea cinerea* : Lin.  
 924.—*Ardea purpurea* : Lin.  
 927.—*Herodias garzetta* : Lin.  
 929.—*Bubulcus coromandus* : Bodd.  
 931.—*Butorides javanica* : Horsf.  
 937.—*Nycticorax griseus* : Lin.

H. EDWIN BARNES.

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## ON THE USES OF PANDANUS OR SCREW PALM,

*Taken from the Journals of the late Handley Sterndale,  
 with prefatory Remarks,*

By his Brother R. A. STERNDALE, F.R.G.S., F.Z.S.,

Read before the Society on the 7th of December 1885 on  
 production of specimens of the fruit by Mr. FRAMJEE  
 N. DAVER.

The *Keora* or *Pandanus Odoratissimus* grows freely throughout India; whether this is identical with the *Pandanus* of the South Seas, I am unable to state, but it must be, from my brother's description, of a closely allied species, and capable of utilization in the same degree. It is, however, but little known in India for economic purposes, its sole recommendation being its extremely fragrant flowers, which are used occasionally by native ladies for adorning their hair.

Roxburgh states that the lower yellow pulpy part of the drupes is sometimes eaten by the natives during times of famine, as also the tender white base of the leaves, either raw or boiled ; the roots are used by basket-makers to tie their work with, and he adds that they are also used for corks. Small indeed are these results as compared with the manifold purposes to which the tree is put by the South Sea islander. Roxburgh notices that the leaves are composed of longitudinal, tough, and useful fibres like those of the pine apple. Yet this economical product has hitherto been neglected, though the tree is so common in parts that hedges are made of it. In the Nicobar Islands it is called the *Mellore* or bread-fruit, being probably used there for food as it is in the South Pacific. In the Mauritius it is extensively employed in the manufacture of sugar and coffee bags and for export. "Hedge-rows or avenues are formed of it round plantations, or along the sides of the many roads which intersect them, and the leaves, as fast as they attain maturity, are cut till the tree arrives at its full growth, when the production of new leaves being slower and less useful, younger plants are resorted to." So wrote Colonel Hardwicke in 1811. Forbes Royle gives but little information beyond quoting Roxburgh and Hardwicke, and the plant in India has not received much attention. Voight says that in China and Cochin elephants are fed on it. Mr. Stonehewer Cooper, in his "Coral Lands of the Pacific," gives an account of the *Pandanus*, which is evidently taken from my brother's writings, the similarity of expression proving this ; he has acknowledged much of his information so gathered, but might have done more in that way ; however, he has added nothing more to our knowledge of the plant than what will be gained in the following paper, written years before Mr. Cooper's book was published, beyond calling it in one place *Pandanus utilis*, which, according to Voight, is a synonym of *P. odoratissimus* ; and stating in another that he does not know of anything that will approach the leaves of the *Pandanus* tree as a paper-making material.\* This is a point worth experimenting on, and it is with a view to bring the many qualities of this plant before the public in India, and interest men in what has been hitherto neglected as a jungly thing of no value that I have extracted from my brother's papers, which I hope to publish some day *in extenso*, the following notes on a worthy rival of the Bamboo and the Cocanut.

"Among the most ubiquitous of vegetable products throughout the Pacific is the *Pandanus* or *Screw Palm*. It is called '*Fara*' in most native tongues, and would seem to a stranger to be as ugly and prickly as it is

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\* I find that Mr. Cooper's account of the *Pandanus*, as well as the remark about its being a good material for the manufacture of paper, is taken *verbatim* without acknowledgment from my brother's report to the New Zealand Government on the Islands of the South Pacific.

densely prolific and apparently useless, but it would be a great error to suppose so, for it is one of the greatest blessings which Providence has bestowed upon man in the savage state. It grows, I have heard, upon all the tropical coasts of Australia, where it is regarded as of no use even by the Aborigines, but to the savages of the Coral Seas it is food, clothing, shelter, and an infinity of benefit. It delights in rocky and gravelly soils, impregnated by the salt spray of the sea (or rather where there is no soil, but gravel only,) and so luxuriates desert isles, where it creates impenetrable thickets. Its appearance is very singular; when young it looks like a tussock of 'sword grass,' the edges of the leaves and the ridge in the middle being fringed with small sharp thorns; these leaves follow each other spirally up the stalk, so that the tree grows with a perfect twist like that of a screw auger. In its earlier stages, when about ten or twelve feet high, it has sometimes a graceful appearance; as it grows older, it becomes grotesque; as it is an inhabitant of stony ridges where roots are unable to penetrate to any depth, and of open coasts exposed to the most furious winds, it secures itself a hold upon the earth by throwing out around its butt a number of stays or shrouds, straight, tough and sappy, each of about the thickness of a man's wrist; they grow round the bole of the tree, following its spiral formation, and appear first as a sort of wart or excrescence; this soon takes the form of a horn growing downwards; it is of a delicate pink, smooth and glossy, and cuts soft like a cabbage-stalk, being full of oily sap, which it is important to know will support life of man or animals where there is no water. It continues to grow thus until the point touches the ground, where it takes firm root by sending out a multitude of fibres which penetrate the sand or crevices of rocks, and wrap themselves securely about the stones. Thus, the brave *Pandanus* will bend to the hurricane, but start—no, not an inch! When full grown, it reaches 30 or 40 feet, and by that time has sent out many odd-looking limbs branching out from the stem something after the fashion of the golden candlestick in the Tabernacle of Aaron, each crowned at the end by a tuft of drooping leaves, a blossom of a pale yellow (something like the flower of Indian corn and of a strong smell, and a large fruit bigger than a man's head, outwardly of a dark green colour and in shape resembling a pine-cone, or the thyrsus represented in the ceremonies of Bacchus. The trunk of the tree is hollow from end to end, and would make excellent drain pipes; the wood is hard as horn and like horn in appearance. I have seen it when used as pillars in some native houses, scraped and polished as bright as mahogany. In the ground it soon decays. The fruit consists of a number of truncated conical polygons, each about 4 inches long, separate from the others, closely wedged together and radiating from the interior stalk. The outer ends of these sections are dark green, impenetrably hard and tough, enclosing eight or ten seeds each, the inner portion, which

is in some species scarlet, in others yellow, has a highly polished surface, and powerful smell like that of a mango; it consists of fibrous pulp in consistence exactly like the interior of a sugar-cane and containing even a larger proportion of saccharine matter; it can be chewed or cut with a knife, and when steamed in an oven seems to consist chiefly of syrup. An intoxicating drink can be made from it by fermenting a mash made of the cooked fruit, as also strong spirits by distillation. The seeds are about the size of a haricot bean and are in appearance and flavour like the kernel of a filbert, so excellent to eat that, were they known, they would be in demand in civilized lands as an article of dessert. But their existence (or nature) is unknown to most Europeans well acquainted with the tree, for as much as these kernels are so concealed and protected as to be almost impossible to get at by those unacquainted with the process. The hard capsules which contain them require to be broken in a peculiar manner by a powerful blow from a heavy stone or sledge hammer, whereby their extraction is very easy. They are wholesome and nutritious. I have on some desert places eaten of them at a time as much as would fill a pint measure. The Polynesians are fond of this fruit, and are constantly chewing the cones; they also thread them on strings after the fashion of a ponderous necklace, so as to form a very gaudy and odoriferous ornament which they eat when they are weary of wearing. Mixed with scraped cocoanut and baked, it is much used on many islands, but as a preserved article of food it is most important, and is in that form peculiar to the Isles of the Equator and the North Pacific. Pounded and dried and packed firmly pressed in baskets, it presents an appearance like coarse saw-dust, and will keep for any length of time. It is called "*Kabobo*," and is the staple article of consumption in many of the equatorial isles and in the Ralik and Ratak chains. Many atolls in these latitudes are destitute of cocoanut trees, so the "*screw palm*" is the sole vegetable subsistence of the inhabitants. The "*Kabobo*" also constitutes the sea stock with which the savage mariners of the Pintados provision their canoes. When required to be eaten, it is mixed with a little water and parched in the sun or baked on hot stones. If it be true that the *Pandanus* grows all round the coasts of North Australia, as I have been assured by seamen that it does, and that the Aborigines of those parts are unacquainted with its use—then do they starve in the midst of plenty—as Solomon says "for lack of knowledge people perish." This I do well know from my own experience that the wastes of very much of New Holland (except where there is absolutely no water either in pools or in '*Mallee*' roots) contain infinitely more means of subsistence for man than such isles as Erikub or Gaspar Rico and other desert cays upon which it has been my fortune to sojourn. But inestimable as is the *Pandanus* in providing food to the inhabitants of desert isles, it is no less valuable to them as the source from whence they derive their shelter, their clothing, and whatsoever

approach to domestic comfort they possess. Their houses are entirely constructed of its timber ; the posts and sills are of the straight columnar trunk, which are set upright round the whole building about 4 feet apart ; down each side of the post, in the line of the wall, is cut a groove about an inch deep, and into these are filled laths which are split with a knife out of the straight stays which grow round the trunks of these trees. Thus is made a very neat and comfortable dwelling ; the doors and window-shutters are made in like manner of the split laths, and the whole is roofed in with the leaves of the same tree. The thatch is made very ingeniously : the frame of the roof being complete, a great number of laths, a fathom long, are split and across them side by side ; the long leaves are doubled and pinned with thin skewers ; these are laid across the rafters one over the other and secured with string ; a roof of this kind looks very neat inside, is impervious to the heaviest rains, and lasts usually from 10 to 12 years. The floors are made of smooth water-worn snow-white coral pebbles from the sea beach, which harbour no insects, and above them are spread mats of this same palm leaf in a double layer, the lower ones of a coarse make, the upper of a finer kind, so delightfully cool and smooth that one may lie upon them with great comfort, absolutely without any clothing between them and the body ; on some islands they are made very handsome, being of a bright straw colour, with a stripe four inches wide along each edge and two others down the middle. This stripe is worked in a variegated pattern in red, yellow and black ; these colours are obtained by dyes made from the juice of certain roots. The floor mats are frequently of great size, sometimes as large as the whole floor, made purposely of corresponding dimensions. On islands where they make them and sell them to trading ships they receive payment at the rate of 2 yards of calico for 2 yards square of fine mat. On islands where the *tapp* tree does not grow, *Pandanus* mats are the only bed clothes, as also clothing for the body. They consist of soft ornamented girdles about 9 inches wide and from 12 to 20 feet long, aprons, pouches and "tiputas ;" these are made very soft and are bleached between salt-water and sunshine until perfectly white ; the patterns which are worked into them are also very handsome. The hats which they make on many isles out of this material are plaited all in one piece, like those which are made in Guayaquil, and are very neat and durable. Some baskets (worked in the same manner as the cigar cases so common in the East Indian islands) they make so very handsome that I have seen one of them sold for five dollars and counted cheap. On Samoa the women wear soft *Pandanus* mat for petticoats and trains, which sweep the ground behind them as they walk on state occasions ; these mats are generally not handsome, being without ornament except sometimes a little red fringe, and are of a dirty straw colour ; nevertheless they are consi-

dered so valuable by them that they will sometimes refuse a hundred dollars for one, and would certainly not give it you in exchange for a Cashmere shawl ; some of these mats are a hundred years old or more, and full of holes, which does not deteriorate from their value. At a *Samoan* marriage an old mat, which is laid under the bride, is often the most precious article in her whole "trousseau," and has been probably a portion of the dowry of her mother and grandmother. The mat which a fighting chief will sometimes wear about his body is accepted as the ransom of his life if he fall into the hands of his foes. The fortunate victor probably knows the history of it before it comes into his possession, and can tell its age, and where and by whose hands it was woven ; the value which they place upon them is wholly fictitious. It is a love of ancient usage which has consecrated them, as the *Samoan* mats are of mean appearance, and neither so becoming nor so comfortable to wear as two fathoms of cotton print which they might buy for a dollar. The work of making mats and other manufactures from the *Pandanus* leaf is all performed by women. The leaf itself is like that of a flag, two or three inches wide ; when gathered, it is laid in the sun to dry ; it is then stretched to prevent its curling and to strip it of its thorny edges. For this purpose the women always keep one of their thumb-nails long, as likewise to split the leaf for finer work ; such portions as are intended to produce the ornamental part of the pattern are then dyed ; the plaiting is performed upon a smooth board with a convex upper surface ; as they use their teeth very much in dividing the leaf, they protect their lower lip by wearing upon it the scale of a fish. The time occupied in this work varies according to its texture of the coarser kinds. A woman will plait in a day a yard deep by two yards wide. The sails of canoes on all these islands are made of such mat. The beautifully variegated aprons of the women of *Micronesia*, and wrappers which the men wear about their loins, consume much time in making ; the texture of the fabric being about equal to that of No. 1 canvas, but much softer after being bleached and worn some time. On the low coral isles the finest mats are made, and with wooden dishes, carved pillows, fish-hooks of pearl or turtle shell, lines of cocoanut fibre and '*Ranan*' bark are the principal articles of exchange. The '*Ranan*' lines are beautiful ; they are immensely strong, white as linen, and, though laid up by hand, are equal in regularity of twist and thickness to the best machine-made whipcord or *Calcutta* white line. These lines are from the dimensions of a packthread to that of a logline which will hold the largest fish ; they last *a great number of years* ; the savages are very careful of them, washing them with fresh water before putting them away whenever they return from fishing ; their finer nets are made of the same bark, which is that of a small tree indigenous to most low coral isles. The making of lines and nets is the work of men. On the *Samoan* isles, when the necessities of life were easily

obtainable, articles of luxury were in demand, such as fine mats, printed *tappa*, carved and ornamented work, feathers of splendid colours, and oval plates or studs of nautilus shell for the adornment of head-dresses, as also for various purposes hawk-bill, turtle and pearl shell. Besides mats another description of clothing is made by savages from the '*Pandanus*.' I have mentioned that it throws out stays from the trunk; these commonly cease to grow out higher than about six feet from the ground, as by that time the growth of the tree upwards has stopped; before touching the ground, where they take root, their consistence is flexible and sappy. If cut off at this stage and soaked in water after being beaten with a mallet, these stakes are found to consist entirely of fibres agglutinated together by an oily sap; they are, when well cleaned, pure white, soft and strong like 'jute' or hemp, and are easily obtainable a yard long; of this fibre they make 'jupons' and a sort of pouches, which are comfortable and serviceable. I have no doubt that this product, if generally known (which it is not), could be turned to some valuable account; it could be obtained in immense quantity and at no cost but the work of cutting and cleaning, as the *Pandanus* completely overruns many coral islands and desert coasts. When we come to consider the numerous wants of man—food, drink, clothing, shelter and an infinity of comforts—which are supplied by the wood, leaves, fruit, and sap of this remarkable tree; when we reflect upon the fact that no human being possessing a modicum of ingenuity and the instinct of self-preservation can positively starve where it grows, and that its natural locality is the most desert coasts of the tropic seas, luxuriating, as it does, upon the barren beach immediately contiguous to high-water mark, where there is no soil whatever or apparent moisture; its nourishment being derived from the arid sand, coral, gravel or boulders of rock, heated throughout the day to a temperature sufficient to burn the human skin, one cannot fail to experience a feeling of astonishment at so striking an evidence of the providence of God."

H. B. STERNDALÉ.

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## A NOTE ON PANDANUS ODORATISSIMUS OR SCREW PALM.

(*Written at the request of R. A. STERNDALÉ, Esq., F.Z.S.,  
to follow his paper.*)

The *Pandanus* we see here is of two kinds. The yellow variety is generally called *Ketaki* (केतकी) or *Suwarna Ketaki* सुवर्ण कतका, as distinguished from the white *Kevadâ* (केवडो), or (श्वेत केवडा) *Sweta Kevadâ*. The yellow variety is much more strongly scented, and is more highly prized by the Hindn ladies, who wear it in their hair. Both these contain staminate



organs alone, surrounded by spathaceous bracts; and it is these bracts that form the chief attraction for ladies. The staminate organs of the yellow variety are simpler than those of the white. The anthers of the former are longitudinal, and open longitudinally, giving vent to a fine impalpable powder strongly scented, and forming the pollen. The stamens are almost sessile or about a line in length. These stamens are innumerable crowded in the shape of a cone on a flesh spike or stalk. The anthers of the white variety are shorter and open longitudinally, but their flesh spike is branched. It gives rise to similar impalpable powder, which is gritty, but perhaps less scented, though sufficiently attractive. These clustered and branched staminate spikes go under the name of Kuyali (कुयली), and if they don't get decomposed or rotten during the process of drying, are of great value in keeping off moths from woollen clothes. At least such is their reputation. The stays or aerial roots Mr. Sterndale mentions in his very valuable paper are used in this country by *goundis* or whitewashers for making brushes to whitewash or colourwash houses. The fibrous tissue is separated from the tender interfibrous substance by beating the top of perhaps half a yard bit of the stay or aerial root and made soft and pliable. It makes a capital brush. There is no other use made of *Kevadâ* that I know of. The female flower or collection of flowers turning into fruit is seldom used for any special purpose in this country.

K. R. KIRTIKAR.

## ZOOLOGICAL NOTES.

### ON VARIATION IN COLOUR IN *URSUS LABIATUS*, THE SLOTH BEAR, &c.

BY R. A. STERNDALÉ.

A CORRESPONDENT in the *Asian* of last week (9th March 1886) gives an account of his killing a sloth bear with two cubs, one of which was brown instead of the usual jet black. In November 1884, I received a letter from Dr. Tomes, Civil Surgeon of Midnapore, asking for my opinion on a skin and skull of a large bear shot in the Midnapore jungle. He described the skin as "a particularly good one, thick and shaggy about the shoulders, of a tawny brown colour throughout, lighter underneath, no black in it anywhere, a whitish collar on chest." Fortunately the skull was preserved, and the dental formula given by Dr. Tomes enabled me to pronounce it an albino of *ursus labiatus*, and not a stray specimen of *ursus isabellinus* escaped from captivity. The sloth bear has, as a rule, two upper incisors less than other bears.

To-day, whilst locking up some correspondence in the *Asian* on another subject, I came across two letters regarding grey bears in the plains of India: one was seen by "H. D. K." writing from Secunderabad, Deccan, of which the hind quarters only were grey; the other was reported by "W. M. R." as seen on

the borders of the Shahabad and Mirzapore districts. He says the greater portions of the bear's body was grey, and a light grey too. The Native Shikaris called it a *sufaid bhal*. Unfortunately neither of these two bears was secured. We have, however, ample proof of albinism in "M.'s" living cub and the Midnapore skin.

#### ON THE FLYING SQUIRREL OF WESTERN INDIA.

There is no doubt the flying squirrel of this Presidency is *Pteromys Oral*, but the prevailing colour is grey, whereas *Pteromys Oral* is a dusky maroon black grizzled with white. I am inclined to think that it is the same as *Pteromys cineraceus*, which is in all essential points identical with *Pteromys Oral*. The Society lately received two living specimens from General Watson, which were made over to me for examination. During the night they managed to gnaw a hole through their cage, and escaped. One was re-captured, but the other, I regret to say, has disappeared. Fortunately we retain the finer specimen. Wonderful stories are told concerning the flight of these animals, though flight is a misnomer. They cannot fly as birds and bats do: they merely spring from a considerable height, and the extended skin between their limbs acts as a parachute and floats them along, letting them down easily. Thus they can skim over a space of 50 to 60 yards. Early on the morning of their escape one was observed sitting on a cornice near a window at the northern corner of the Currency Office, where I live. On a servant trying to catch it sprang off in the direction of the Bombay Club and alighted near the Club-door. The distance was sixty-nine paces. These animals are quite nocturnal in their habits, sleeping all day rolled up in a ball with the head tucked in between their fore legs and the tail coiled round the body. At night they are very active.

#### ON A SPECIES OF PIGMY SHREW.

I would call the attention of Naturalists to the existence of a Pigmy Shrew in the low lands of this Presidency, as more specimens are wanted, and it is possible that on such being found, they are thrown aside under the impression that they are the young of the ordinary species of Musk-rat. The pigmy Shrews are a dwarf race, generally found in the hilly parts of India, Ceylon and Burmah, and they vary in size from  $1\frac{1}{2}$  to nearly two inches, exclusive of tail, which is about another inch. They are true Shrews with all the characteristics of the genus, and a Burmese species, *Sorex nudipes*, has the musk glands strongly developed. The Society has received one lately from Mr. Littledale, which he found at Baroda swimming about in a flower-pot during the rains of 1884. He writes: "I kept it alive 3 or 4 days, giving it crickets and flies. It liked to get under a bit of cotton wool, in the shade, and used to make a sudden dash at the cricket if it came near, crunching its back and hind legs first. It has not shrunk at all. It was mouse colour, and the snout pale fleshy. The eyes seemed greyish blue." I have been unable to determine the species as yet; the nearest approach to it is *Sorex perroteti* from the Nilgherries, but it does not agree in colour. *S. perroteti* being blackish brown, whereas this is a pale mouse colour, rather silvery when taken out of the spirit and dried.

R. A. STERNDALÉ.

## ON THE FREQUENCY OF ALBINOISM IN CUTCH, &amp;c.

BY MR. A. T. H. NEWNHAM, S.C., 10th N. I., WITH

NOTES BY MR. E. H. AITKEN.

FREQUENT OCCURRENCE OF ALBINOISM IN CUTCH.—Within the last few months the following cases of albinism have come under my notice, which, I think, are sufficiently numerous to be worthy of mention, *viz.*, May 24, *Chattorhæa striata* (the striated babbler, presented to Society's collection); July, *Perdica asiatica*, bush quail (presented to Society's collection); and *Molpastes haemorrhous*, the Madras Bulbul, partially so, the wings only being white. It would seem as though the prevailing tint of the country, which is principally composed of sandy plains, had some influence on the colouring of its inhabitants, for the birds generally are of a paler colour than the same species which I have noticed where the soil is darker in tone. Besides these specimens which have been shot and obtained, there have been other occurrences. Last year a perfectly white *Sarkidiornis melanotos*, more generally known among sportsmen as the Nukta, used frequently to be seen on one of the sacred tanks of Bhuj, where unfortunately it is forbidden to shoot, and a second case of *P. Asiatica* was met without shooting. The latter, strictly speaking, was of a soft fawn colour rather than white. A white squirrel also used to haunt one of the bungalows here.

THE BHALU.—We are occasionally visited at night by one of these mysterious Janwars. There are various explanations given as to what it really is; some asserting that it is a lynx, others a female jackal, and others that it is an old worn-out jackal, which follows in the tracks of some larger animal to obtain its leavings. I know the latter is the more general belief, but though I have made frequent enquiries from the Shikaris and villagers here I have not come across any one yet who has actually seen one. The cry is a sort of convulsive scream ending abruptly in a hoarse crack. I never hear it at night without rallying forth with a gun to try and shoot it and clear up the mystery for myself, but hitherto without success. One moonlight night I heard its cry quite close to me, but could distinguish nothing. Perhaps some of your correspondents can enlighten me as to what it is.\*

A. T. H. NEWNHAM.

NOTE BY MR. AITKEN.—Mr. Newnham's observations are supported by several things that came under my notice during a year's residence at Kharaghora on the borders of the Ruin of Cutch. There were not many species of butterflies at the place, but the two commonest, *Danaus chrysippus* and *Papili siphilus*, were often conspicuously pale and colourless. They would have been considered poor specimens if caught in Bombay. I believe that variety of the former, with a dash of white on the hind wings, which has been separated under the name of *D. alcippoides*, is only a stronger exemplification of the same effect. It would probably be found to be not uncommon in this region.

\* The Kol Bhalu, Pheal, Pheen, Phinkarr, or Sial, is an ordinary jackal. Several have been shot in the act of howling, and there was nothing abnormal about them. The subject was well ventilated in the *Asian* in 1881-82, and the general opinion pointed to the above conclusion. Correspondents gave evidence from all parts of India.—R. A. S.

Of four specimens of *D. dorippus* from Aden, now in the Society's collection, two exhibit this dash of white. On the other hand, collections of butterflies caught among the luxuriant vegetation of Khandalla or Matheran generally contain specimens with a depth of colour never met with on the plains.

But the strangest instance of the effect of an arid, sandy country on animal colour, if it was really an instance, was a mongoose which I repeatedly saw at Kharaghora, but did not secure. It was apparently the common mongoose of Bombay (*H. Griseus*),\* but the tip of its tail, instead of being blackish, was white. A solitary "sport" like this has not much significance by itself, but it becomes suggestive when we remember that the desert fox of Cutch (*leucopus*) differs from the common Indian fox in this very point that its tail is tipped with white instead of black.

E. H. A.

## BOTANICAL NOTES.

### ON AN INSTANCE OF FRUCTIFICATION IN A STAMINIFEROUS PLANT, *CARICA PAPAYA*.

BY SURGEON-MAJOR G. BAINBRIDGE, I.M.D.

The *Papayaceæ* form a small order of three or four genera and 25 or 30 species only, not very distantly related to the cucumbers. The species are all tropical, and several inhabit S. America, of which the plant under notice is supposed to be a native.

*Carica Papaya* is the best-known individual of its order, and has excited much interest owing to the presence in its tissues of *Papain*, an alkaloid or principle having the property of digesting animal substances, and serviceable, therefore, as a medicinal agent.

As is well known, the plant is normally dioecious and one of the most conspicuous examples of this marital arrangement. You will all have distinguished the male, with its long-stalked panicles of small yellowish flowers, from the female or pistilliferous tree, with its much larger, whitish, rather campanulate flowers, which are closely arranged around the trunk and branches, under the shelter of the leaves, and, having very short stalks, are nearly sessile.

I was not aware until recently that this arrangement was ever departed from. But in January last year (1884) I was surprised to find at Dharwar, in the garden of a house I had just entered, a male *Papaya* tree bearing fruit upon its long pendent stalks.

On examination I found its flowers to resemble the typical male ones in every respect, except in the presence of a minute ovary in at least some of them.

By April the fruit had grown to a considerable size, so that some of them measured ten and thirteen inches in circumference; and, what was more interesting, they contained numbers of ripe black seeds about three-fourths

\* Probably *H. Ferrugineus*, Sind species, the tail of which is lighter coloured normally.—R. A. S.

of the size of normal ones from well-grown fruit. I saved a large number of them, intending to try whether they would germinate; but they were lost in the hurry of my transfer.

I now show three small specimens of the fruit of the same tree which I have had sent to me. The largest measures six inches in circumference. I also present a rough sketch of the tree drawn in April last.

I imagined this curious occurrence to be almost unique; for its possibility was hitherto unknown to me, though I have seen much of *Papaya* cultivation for some years. I find, however, that the fact is noted by Roxburgh in the *Flora Indica*, 1832, where he mentions two instances, and states that the same is common at Malacca.

Botanical class books and other authorities which I have examined do not mention the matter. There seem to be two varieties of *Papaya*, one producing rather globular, and the other citron-shaped, fruit of much larger size and superior quality. Fertility of soil may, however, possibly account for this and for the strange "variation" to which I have drawn attention.

G. BAINBRIDGE.

#### ON ABNORMAL DEVELOPMENT IN MUSA SAPIENTUM.

BY SURGEON K. R. KIRTIKAR, I.M.D.

Read on 1st September 1885 before the Botanical Section.

I submit a photographic print\* of an abnormal development of the flowerstalk of *Musa Sapientum* (Banana) growing in a garden on Girgaum Back Road, Bombay. The drooping spike, after having thrown out two or three clusters of flowers in the axils of the first two or three purple fleshy bracts, sub-divides and thus forms two spikes instead of a single central. The primary spike remains thicker than the secondary stalk, as the division of the spike is not strictly dichotomous. The secondary grows longer and sub-divides again. The primary also, after throwing a few more clusters of flowers, sub-divide again into two spikelets. Thus, there are four spikelets instead of one spike. The final or apical buds, sheathed in their purple bracts, still remain, with a few abortive flowers. I call these "abortive" flowers, because they never turn into the fruit called banana or plantain, but open and die.

#### NOTE ON AGARICUS OSTREATUS.

The Fungus described by Dr. Dymock in his *Vegetable Materia Medica* of Western India (p. 704, 1st Edition) is called *Phanasamba* in Marathi and named by him as *Agaricus ostreatus*. *Agaricus ostreatus* often does grow on jackfruit tree. But on examining genuine specimens of what is usually gathered and sold and used under the name of *Phanasamba*, it appears to be a *Polyporus* and not an *Agaricus*. (See Badham's *Esculent*

\* A water-colour drawing from the same has since been presented by Surgeon Kirtikar to the Society, of which a lithographic print accompanies this.

Fungi, Plate X., and Mrs. Hassey's Illustrations of British Mycology, XIX. Plate, Second Series). Dr. Sakharam Arjun, following old descriptions, also calls the fungus *Agaricus ostreatus*.

But a figure of the *Polyporus* is given in Batsch's *Elenchus Fungorum*, Plate XLI., page 114, *Continuatio Secunda*. It is called *Boletus "Nitens"* or *Crocatus*. It appears a proper description of *Phanasamba* has not yet appeared. I exhibit several specimens, a general description of which will appear in my work on the Bombay Fungi, which I hope will be published at no distant date. As this variety of *Polyporus* mainly derives its name from its habitat—growing on *Phanas* or Jack tree,—I have named it *Boletus Nitens Artocarpalis*.

### ON THE FRUIT OF TRAPA BISPINOSA.

The fruit of *Trapa Bispinosa* (exhibited along with the plant in flower), *Shingâda* as known among the Hindus.

The fruit resembles, roughly speaking, a bullock's head in miniature, and is an important and highly-prized article of diet among the Hindus. The whole of the fruit is mealy, and is as delicious when baked or boiled as a chestnut. Peeled, pounded and boiled with milk and sugar, it forms an excellent repast under the name of *hulwa*, and deserves to be more widely known. It is eaten either fresh, or is peeled and dried for use afterwards. For drying, only the mature fruit is serviceable; if it is not mature, it shrivels up and often decays. Mixed with pepper, salt and cocoanut kernel scrapings and fried in ghee or clarified butter, in lumps as big as a cherry or plum, it is very delicious. It is highly valued by the Guzrathis, and is generally sold dried in a *Kirani's* shop (seller of groceries and spices), and very largely used on fast days, when rice, wheat, and such other daily articles of food are not eaten.

The plant which bears this fruit is an aquatic annual, and grows very quickly. It is cultivated largely in tanks around Thana, the young sprouts being simply deposited on the surface of the water. It flowers about August and September, and fruit is gathered about November. If the old and dead decaying leaves are removed as they form from time to time, the tanks in which the plant is cultivated have clear water, probably from destroying minor vegetable life on which it feeds, or at any rate partially derives its nourishment.

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### NOTE ON KASRA OR SCIRPUS KYSOOR.

Read on 22nd January 1886.

I exhibit to-day three articles—(1) the boiled hairy root-bulb; (2) the same boiled and peeled; (3) a *hulwa* made of the peeled bulb. I also exhibit along with specimen No. 3 a *hulwa* made of the fruit of *Shingâda* referred to in my Notes read before this Section at our Septem-

ber Meeting. Pounds and pounds of this delicious bulb are used as an article of diet on fast days among Hindus. The root bulb is often sold dried after being peeled. The plant itself belongs to the Sedgewort family, and is described at p. 288 of Dalzell and Gibson's Flora. The bulbs are gathered in January, February and March, after the plant dies. I exhibit the plant here. It thrives in the rainy season, and grows abundantly in tanks round Thana. The skin of the bulb is hairy; the rootlets being often two or three inches long and tufted at the apex, or extreme end. The roots sometimes shoot out in rings round the body of the bulb. The leaf of the plant is hispid, 3 to 5 feet long, studded with oblong air spaces. The plant flowers in the rainy season about July or August, and having lived its annual life, dies away. It is after this that the bulbs are gathered; they are edible even uncooked, but are not very palatable. They are usually in very great quest, and are obtainable at one anna a hundred bulbs. The *hulwa* made with sugar and milk is considered a dainty. This *hulwa* is more glutinous than the *hulwa* of *Shingâda*. It would be interesting to find out the relative food-value of these important articles of diet, especially as regards the proportion of starch gluten, and salts. The leaf does not seem to be sufficiently strong for any of the purposes for which common bulrushes are used, such as for making mats, baskets, chair bottoms, nor do I know of any medicinal uses of the plant. At page 721 of his Vegetable Materia Medica, Dr. Dymock asks a question as to whether *Kasceroo* (Hind) is the *Scirpus Kysoor* of Roxburgh. I am certain it is. Dr. Dymock also says it is given in diarrhoea and vomiting. If in addition to its value as a delicate article of food, it is really useful in diarrhoea, a congee made of it with milk will be a very suitable form of nourishment in diarrhoea cases and in vomiting. I can bear testimony to its bland and soothing properties. The boiled bulb with common salt is very delicate eating.

K. R. KIRTIKAR.

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## NOTE ON A SUPPOSED ROOT-PARASITE FOUND AT MAHABLESHWAR IN OCTOBER 1885.

BY MRS. W. E. HART, *Read on 15th March 1886.*

IN October a tuberous-rooted plant of curious structure, which I have endeavoured to sketch below, was brought to me at Mahableshwar, from one of the valley jungles below the hill. The rains had continued more than usually late, which may account for there being then still visible a plant which neither I nor any one to whom I showed it had ever seen before. It grew in clusters in moist red laterite clay, through which occurred the numerous root fibres (lately severed) of some large dicotyledonous tree. The man who brought me the plant declared that he very rarely met with it, never except during the rains, and then only in the

thickest jungle, and always at the foot of some large tree. But he was unable to state whether the large tree was always of the same species. The first thing to appear above the soil was a yellow spathaceous stalk, bearing on its summit a ball, about the size of a marble, almost concealed among the spathes. Most of these balls were of a velvety texture and a rich brown colour. Two were rough, not unlike fir-cones. The balls continued to grow in circumference as the stalks grew in height, till the latter were about 3 inches long and the balls about the size of bagatelle balls. A number of minute white flowers then opened over the whole surface of the rough ball. Having no microscope or magnifying glass with me, I was unable to identify the plant from the examination of its extremely minute structural parts. Dr. Macdonald determined the open flowers on the rough heads to be staminal only, and conjectured the velvety balls to be composed of pistillate flowers only, and from the stamens being sinuous and united into a central column, he was inclined to think the plant might possibly belong to the Natural order Cucurbitaceæ. But as he also had no magnifier, he was unable to speak with certainty, and failed to identify the plant. I much doubt if there is any Cucurbitaceous plant without the climbing habit so characteristic of that order. On the other hand, the small Natural orders Cytinaceæ and Balanophoraceæ, especially the latter, present some features similar to those noticed in my Mahableshwar plant. The following characteristics at least of Balanophoraceæ, as described by Dr. Balfour in his Class Book of Botany, seem to be identical with both those noticed by himself and those determined by Dr. Macdonald :—"Leafless...with tubers...whence proceed naked or scaly peduncles bearing heads of unisexual flowers. Staminal flowers generally white...anthers...united into a multicellular mass...Parasitic on the roots of various dicotyledons, and abounding on the mountains of tropical countries." Dr. Balfour certainly says nothing of the very curious and characteristic velvety ball, nor was the parasitic nature of my plant fully established, but what I ascertained of its habits from the man who brought it to me is at least not inconsistent with its being a root-parasite. He also informed me that the plants died down in the dry weather and had never been known to survive removal. I kept mine alive for some weeks in a soup-plate of water, but it was completely withered before I left Mahableshwar in January.

A.—Brown velvety ball.

B.—Rough ball covered with minute white flowers.

C.—Spathaceous stalk, greenish-yellow towards the top and brighter-yellow in the lower part.

D.—Lump of red marly earth, apparently moist laterite clay, containing numerous root fibres, in which the plant was growing.

I incline to the belief that the plant was one of the Balanophoraceæ. But the man who brought it to me was not aware of its possessing any useful



properties, nor did he know any native name for it, though Dr. Balfour describes the Balanophoraceæ as being some of them styptic, and others edible. I can find no reference to Balanophoraceæ in Dalzell and Gibson's "Bombay Flora," published in 1861, nor in Gell's "Handbook for use in the Jungles of Western India," published in 1863, nor in Drury's "Useful Plants of India," published in 1873. In the "Cyclopædia of Natural History," published by Bradbury and Evans in 1856, two years after Dr. Balfour's "Class Book," the Balanophoraceæ are described as "a natural order of parasitical plants growing upon the roots of woody plants in tropical countries and rooting into wood from which they draw their nutriment. . . . None of the species have fully formed leaves, but closely packed fleshy scales clothe their stems and guard their flowers in their infancy. Succulent in texture, dingy in colour, and often springing from a brown and shapeless root stock, Balanophoraceæ remind the observer of fungi more than of flowering plants, and in fact they appear intermediate in nature between the two. If they have flowers and sexes both are of the simplest kind, and their ovules, instead of changing to seeds like those of other flowering plants, become, according to Endlicher, bags of spores, like those of true flowerless plants. Even their woody system is of the most imperfect kind, for it is either entirely, or almost entirely, destitute of spiral vessels." This writer also notices the styptic and edible properties of certain species.\* Again, however, nothing is said of the large velvety ball, so striking in my specimen. It is figured in the illustration to the article which I have quoted, but as oval in shape, and small in size in proportion to the length of the stalk, which, again, is represented as smooth and slender.

I have trespassed at this length on your patience, because, if I am right in my theory that my plant was a Balanophora, it is interesting to botanists for two reasons: *first*, as being hitherto undescribed in the Flora of this Presidency; and *secondly*, and specially, as being, apparently, a link connecting the fungi directly with the flowering plants, without the intervention of the Ferns and other higher orders of Cryptogams, which may possibly be of value in the discussion of the Darwinian theory of evolution.

J. B. H.

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\* Dr. Dymock, in his "Materia Medica of Western India," states that a drug is sold in Bombay called by the natives *Gaj Pipal*, which Messrs. S Arjun and N. M. Khan Sahib consider to be the entire plant of a Balanophora. It appears to be of a different species to the above, and is considered mucilaginous and astringent.—J. B. H.

MEMORANDUM BY DR. D. MACDONALD, M.D., *Vice-President of the Society*, ON THE SPECIES OF BALANOPHORA, FOUND AND DESCRIBED BY MRS. W. E. HART.

THE plant consisted of an irregular, somewhat flattened rhizome, roughly tubercular on its upper surface, and having the remains of rootlets on its under surface. On the upper surface of the rhizome there were several short unbranched cylindrical peduncles,  $\frac{1}{2}$  inch or more in diameter, more or less completely covered by imbricated fleshy scales, of a yellowish colour; the peduncle terminated in a rounded convex head, on which were studded numerous flowers. These heads were of two kinds—one being covered with staminate flowers, consisting of a deeply four-lobed perianth, enclosing a central column or androphore, and having the anthers arranged in a sinuous ~~in~~ form on its summit. The second kind of head was soft and velvety to the touch; but the separate flowers, which were densely packed, were too small to admit of identification without a magnifying glass. One or two small portions I tried to preserve, and after leaving the hills I was able to make out that they were pistillate flowers, with a minute ovary, and a simple style and stigma.

My first impression was that the plant was possibly a peculiar cucurbitaceous plant, seeing the flowers were monæcious, and that the staminate flowers had monadelphous stamens with sinuous anthers. But on returning to Bombay I found the characters answered to the descriptions given of the Balanophoraceæ—an order which Hooker has studied with great minuteness, and which has many points of special interest.

More than thirty years ago botanists grouped several orders—Cytinaceæ, Rafflesiaceæ and Balanophoraceæ—into a separate class, which was placed between the flowering and non-flowering plants. These orders had a few characters in common: they were parasitical; destitute of true leaves; the stem was generally an amorphous fungoid mass, and there was an absence of green colour. The nature of the seeds was little known, some being described as consisting of a mass of spores, and others as having a cellular nucleus. The researches of Hooker and others have shown that there were not sufficient grounds for forming a new class, and now these orders are looked upon as simply degraded exogens. Hooker considers the Balanophoraceæ allied to the Natural Order Haloragaceæ. Lindley

and others have confirmed the statement of the elder Richard that the seeds of at least some plants of the order contain an embryo, which is minute, globular, and undivided.

The Balanophoraceæ have been likened to fungi from their appearance and mode of growth, but they differ from fungi in consistence, anatomy, structure, slow mode of growth, and in having conspicuous male flowers. The parasitism of the plants is of such a nature that there is some difficulty in making out where the tissues of the host-plant end, and those of the parasite commences, as the vascular tissue of the one is continuous with that of the other.

The Balanophoraceæ are parasitic on the roots of trees, and are found in the mountains of tropical countries. Several species are found in the Himalayas, and in the Khasya Hills, and eight or ten species are stated by Griffiths to inhabit the Indian continent. One plant—a Balanophore—is mentioned in a list of plants in the N. W. as being sold in the bazars under the native name of *Gochamûl*; and another in Kashmir, or another name for the same plant, *Gargazmûl*. But I am not aware of any Balanophors having been described as found in the Bombay Presidency.

Astringency is common to most plants of the order, and one (*Fungus melitensis*) was known so far back as the time of the Crusades, when it was used medicinally as a styptic. A few of the plants are edible, one of which, known in Peru as Mountain Maize, grows with wonderful rapidity after rain. In this plant it is not the rhizome, but the scape, or flowering stalk, which is used. It is said to be eaten like mushrooms, which it resembles in outward configuration. Candles are made from a hydrocarbon obtained from a Java Balanophor.

The Mahableswhar plant is a Balanophor, and undoubtedly it belongs to the tribe Eubalanophoreæ, as it is the only tribe of the seven into which the order is divided in which the perianth of the staminate flowers is four-lobed, and the stamens monadelphous. It is not impossible that Mrs. Hart's paper may be the means of drawing attention to any monograph or publication in which the plant is described, if any exists. Should any member of the B. N. H. S. be fortunate enough to produce another specimen of the same plant, it would probably be best preserved in spirit.

# LIST OF BIRD SKINS FROM THE SOUTH KONKAN.

(*Ratnagiri and Savantvadi*)

Presented to the Society by Mr. G. W. VIDAL, C.S., January 1886.

No. in List of Birds of India.	Species.	No. and Sex of Specimens.	Total No. of Skins of each species.
2	Otogyps calvus—Scop.....	<i>m</i>	1
8	Falco peregrinus—Gm. ....	<i>m</i>	1
17	Cerchneis tinnunculus—Lin. ....	<i>m m m m i</i>	5
23	Astur badius—Gm. ....	<i>m f f</i>	3
31	Hierætus pennatus—Gm. ....	<i>m m</i>	2
35	Limnæetus cirrhatus—Gm. ....	<i>f</i>	1
39 <i>bis</i>	Spilornis melanotis—Jerd. ....	<i>i</i>	1
48	Butastur teesa .....	<i>f</i>	1
51	Circus macrurus—S. G. Gm. ....	<i>m f f</i>	3
54	Circus æurginosus—Lin. ....	<i>m</i>	1
55	Haliastur indus—Bodd.....	<i>m</i>	1
56	Milvus govinda—Sykes .....	<i>m</i>	1
60	Strix javanica—Gm.....	<i>m</i>	1
65	Syrnium ocellatum—Less. ....	<i>m f</i>	2
74 <i>sept</i>	Scops brucii—Hume.....	<i>f</i>	1
75 <i>quat</i>	Scops malabaricus—Jerd.....	<i>i i</i>	2
76	Carine brama—Tem. ....	<i>f f f f f i</i>	6
78	Glaucidium malabaricum—Bly. [not typical, but intermediate between <i>malabaricum</i> and <i>radiatum</i> (77) ] .....	<i>m f i</i>	3
82	Hirundo rustica—Lin .....	<i>m</i>	1
84	Hirundo filifera—Steph. ....	<i>f f</i>	2
90	Ptyonoprogne concolor.....	<i>i i</i>	2
102	Cypsellus batassiensis—J. E. Gr..	<i>i</i>	1
103	Collocalia unicolor—Jerd.....	<i>m m m m m f i i i i i</i>	11
107	Caprimulgus indicus—Lath. ....	<i>m f f</i>	3
112	———— asiaticus—Lath. ....	<i>m m m m</i>	4
114	———— monticolus—Frankl...	<i>m m f f</i>	4
117	Merops viridis—Lin. ....	<i>i i</i>	2
118	———— philippinus—Lin.....	<i>m f</i>	2
123	Coracias indica—Lin .....	<i>f</i>	1
127	Pelargopsis gurial—Pears .....	<i>i</i>	1
129	Halcyon Smyrnensis—Lin .....	<i>m m m f f</i>	5
132	———— chloris—Bodd .....	<i>m i</i>	2
134	Alcedo bengalensis—Gm. ....	<i>i</i>	1
136	Ceryle rudis—Lin. ....	<i>m</i>	1
140	Dichoceros cavatus—Shaw .....	<i>f</i>	1
141	Hydrocissa coronata—Bodd. ....	<i>m f f f</i>	4
148	Palæornis torquatus—Bodd. ....	<i>m m f</i>	3
149	———— purpureus—P.L.S. Müll	<i>m</i>	1
151	———— columboides—Vig.....	<i>m f f i</i>	4
153	Loriculus vernalis—Sparrm. ....	<i>m m f f</i>	4
160	Picus mahrattensis—Lath. ....	<i>m m f</i>	3
164	Yungipicus nanus—Vig.....	<i>m</i>	1
167	Chrysocolaptes festivus—Bodd....	<i>m f f</i>	3
179	Micropternus gularis—Jerd. [not typical, almost as near <i>phæoceps</i> (178) ] .....	<i>m f f</i>	3
181	Brachypternus puncticollis—Malh.	<i>m m f f f f f f f</i>	10
193 <i>bis</i>	Megalæma inornata—Wald.....	<i>m m f f f</i>	5
194	———— viridis—Bodd .....	<i>m m</i>	2

No. in List of Birds of India.	Species.	No. and Sex of Specimens.	Total No. of Skins of each species
197	Xanthoœma hæmacephala— P. L. S. Müll.....	m m m f	4
202	Cuculus sonnerati—Lath .....	m	1
205	Hierococcyx varius—Vahl.....	i	1
208	Cacomantis passerinus—Vahl.....	f	1
212	Coccytes jacobinus—Bodd .....	m	1
213	———— coromandus—Lin .....	m	1
214	Eudynamis honorata—Lin .....	m m f f f f	6
217	Centrocoocyx rufipennis—Ill .....	m f i i i	5
219	Taccocna leschenaulti—Less .....	m m	2
226	Æthopyga vigorsii—Sykes .....	m	1
232	Cinnyris zeylonica—Lin .....	f i	2
234	———— asiatica—Lath .....	m i	2
235	———— lotenia—Lin .....	m m	2
238	Dicæum erythrorhynchus—Lath...	i i	2
239	———— concolor—Jerd. ....	i	1
240	Piprisoma agile—Tich. ....	f f	2
254	Upupa epops—Lin. ....	f f	2
257	Lanius erythronotus—Vig. ....	f	1
260	———— vittatus—Valenc.....	f	1
265	Tephrodornis pondicerianus—Gm.	m m	2
267	Hemipus picatus—Sykes .....	m f	2
268	Volvocivora Sykesi—Strickl. ....	m m f f	4
270	Graucalus macii—Less.....	m m f i	4
272	Pericrocotus flammeus—Forst ...	m f	2
276	———— perigrinus—Lin .....	m	1
278	Buchanga atra—Herm.....	m f	2
280	———— longicaudata—Hay .....	m	1
281	———— cærulescens—Lin.....	m	1
285	Dissemurus paradiseus—Lin. ....	m m f f	4
286	Chibia hottentota—Lin. ....	f f f f	4
287	Artamus fuscus—Vieill ...	m m f	3
288	Muscipeta paradisi—Lin .....	m m m m	4
290	Hypothymis azurea—Bodd.....	m m f f	4
293	Leucocerca leucogaster—Cuv.....	m m i	3
297	Alseonax latirostris—Raffl .....	m m	2
301	Stoporala melanops—Vig. ....	m f i	3
306	Cyornis tickelli—Bly. ....	m m	2
342	Myiophoneus Horsfieldi—Vig.....	m f i i	4
345	Pitta brachyura—Lin .....	m m m m	4
351	Cyanocinclus cyanus—Lin.....	m f	2
353	Petrophila cinclorhyncha—Vig....	m m m m f f	6
354	Geocichla cyanotes—Jard. & Selb.	m m f f i	5
355	———— citrina—Lath .....	m	1
359	Merula nigropileæ—Lafr.....	m m m f f f f f	8
385	Pyctoris sinensis—Gm. ....	f f f	3
389	Alcippe poiocephala—Jerd.....	m f i	3
398	Dumetia albogularis—Bly. ....	i i	2
399	Pellorneum ruficeps—Sws. ....	f f f f	4
404	Pomatorhinus Horsfieldi—Sykes...	m m m f	4
435	Malacocercus Somervillii—Sykes..	m m m m m f f f f f i i i i	13
446	Hypsipetes ganessa—Sykes ...	f	1
450	Criniger ictericus—Strickl. ....	f f i i i	5
452	Ixus luteolus—Less.....	m f f	3
460	<i>bis</i> Otocompsa fuscicaudata—Gould.	m m	2
462	Molpastes hæmorrhous—Gm. ....	f	1
463	Phyllornis Jerdoni .....	m m m m f	5
468	Iora tiphia—Lin. ....	m m i i	4
470	Oriolus kundoo—Sykes .....	m m	2
472	———— melanocephalus—Lin. ...	m m f i	4
475	Copsychus saularis—Lin.....	m	1

No. in List of Birds of India.	Species.	No. and Sex of Specimens.	Total No. of Skins of each species.
476	<i>Cercotrichas macrura</i> —Gm. ....	<i>m</i>	1
479	<i>Thamnobia fulicata</i> —Lin. ....	<i>ff</i>	2
481	<i>Pratincola caprata</i> —Lin. ....	<i>mf</i>	2
483	———— <i>indicus</i> —Bly. ....	<i>i</i>	1
497	<i>Ruticilla rufiventris</i> —Vieill. ....	<i>mm</i>	2
514	<i>Cyanecula suecica</i> —Lin. ....	<i>mf</i>	2
515	<i>Acrocephalus stentorius</i> —Hemp. and Ehr...	<i>mmf</i>	3
516	———— <i>dumetorum</i> —Bly...	<i>m</i>	1
534	<i>Prinia socialis</i> —Sykes .....	<i>i</i>	1
538	———— <i>Hodgsoni</i> —Bly .....	<i>ii</i>	2
543	<i>Drymœca inornata</i> —Sykes .....	<i>i</i>	1
544	<i>bis</i> ——— <i>rufescens</i> —Hume. ....	<i>mmmf</i>	4
559	<i>Phylloscopus nitidus</i> —Bly .....	<i>mf</i>	2
560	———— <i>viridanus</i> —Bly .....	<i>iii</i>	4
563	<i>Reguloides occipitalis</i> —Jerd .....	<i>m</i>	1
589	<i>Motacilla maderaspatensis</i> —Gm...	<i>mf</i>	3
591	<i>bis</i> ——— <i>dukhunensis</i> —Sykes .....	<i>i</i>	1
592	<i>Calobates melanope</i> —Pall. ....	<i>m</i>	1
593	<i>Budytes cinereicapilla</i> —Savi .....	<i>m</i>	1
595	<i>Limonidromus indicus</i> —Gm .....	<i>m</i>	1
597	<i>Anthus trivialis</i> —Lin. ....	<i>mi</i>	2
600	<i>Corydalla rufula</i> —Vieill .....	<i>mi</i>	2
631	<i>Zosterops palpebrosa</i> —Tem .....	<i>mi</i>	2
648	<i>Machlolophus aplonotus</i> —Bly .....	<i>mf</i>	2
660	<i>Corvus macrorhynchus</i> —Wagl. ...	<i>m</i>	1
663	———— <i>splendens</i> —Vieill .....	<i>m</i>	1
674	<i>Dendrocitta rufa</i> —Scop. ....	<i>ff</i>	3
684	<i>Acridotheres tristis</i> —Lin. ....	<i>mf</i>	2
686	———— <i>fuscus</i> —Wagl. ....	<i>mmfff</i>	6
687	<i>Sturnia pagodarum</i> —Gm. ....	<i>mmf i</i>	5
688	———— <i>malabarica</i> —Gm. ....	<i>mmfff</i>	6
690	<i>Pastor roseus</i> .....	<i>mm</i>	3
698	<i>Anadina rubronigra</i> —Hodg. ....	<i>i</i>	1
699	———— <i>punctulata</i> .....	<i>mf</i>	3
706	<i>Passer domesticus</i> —Lin .....	<i>m</i>	1
711	<i>Gymnoris flavicollis</i> —Frankl .....	<i>f</i>	1
721	<i>Euspiza melanocephala</i> —Scop .....	<i>m</i>	1
758	<i>Ammomanes phoenicura</i> —Frankl .	<i>mmf</i>	3
760	<i>bis</i> <i>Pyrrhulanda grisea</i> —Scop .....	<i>ii</i>	2
765	<i>Spizalauda malabarica</i> —Scop .....	<i>mmf</i>	3
773	<i>Crocopus chlorigaster</i> —Bly .....	<i>mi</i>	2
775	<i>Osmotreron malabarica</i> —Jerd .....	<i>f</i>	1
786	<i>Palumbus Elphinstonii</i> —Sykes ...	<i>f</i>	1
788	<i>Columba intermedia</i> —Strickl .....	<i>f</i>	1
794	<i>Turtur senegalensis</i> —Lin. ....	<i>i</i>	1
797	———— <i>tranquebaricus</i> —Herm ...	<i>m</i>	1
798	<i>Chalcophaps indica</i> —Lin .....	<i>m</i>	1
803	<i>Pavo cristatus</i> —Lin .....	<i>mf</i>	2
814	<i>Galloperdix spadiceus</i> —Gm. ....	<i>mf</i>	3
826	<i>Perdica asiatica</i> —Lath .....	<i>mmmmmf</i>	8
829	<i>Coturnix communis</i> —Bonn .....	<i>m</i>	1
830	———— <i>coromandelica</i> —Gm .....	<i>f</i>	1
832	<i>Turnix taigoor</i> —Sykes .....	<i>fff</i>	3
840	<i>Cursorius coromandelicus</i> —Gm ...	<i>mmi</i>	3
846	<i>Ægialitis geoffroyi</i> —Wagl .....	<i>f</i>	1
847	———— <i>mongola</i> —Pall .....	<i>mf</i>	3
856	<i>Lobipluvia malabarica</i> —Bodd .....	<i>i</i>	1
859	<i>Œdicnemus scolopax</i> —S. G. Gm.	<i>mmf</i>	3
872	<i>Gallinago gallinula</i> —Lin. ....	<i>i</i>	1
873	<i>Rhynchœa bengalensis</i> —Lin. ....	<i>m</i>	1

No. in List of Birds of India.	Species.	No. and Sex of Specimens.	Total No. of Skins of each species
877	<i>Numenius lineatus</i> —Cuv.....	<i>f</i>	1
878	———— <i>phæopus</i> —Lin. ....	<i>m</i>	1
882	<i>Tringa subarquata</i> —Güld .....	<i>m</i>	1
884	———— <i>minuta</i> —Leist .. ..	<i>i</i>	1
893	<i>Tringoides hypoleucus</i> —Lin. ....	<i>i</i>	1
894	<i>Totanus glottis</i> —Lin. ....	<i>i</i>	1
898	<i>Himantopus candidus</i> —Bonn.....	<i>f</i>	1
901	<i>Hydrophasianus chirurgus</i> —Scop.	<i>f</i>	1
903	<i>Fulica atra</i> —Lin. ....	<i>m</i>	1
905	<i>Gallinula chloropus</i> —Lin.....	<i>m f</i>	2
907	<i>Erythra phoenicura</i> —Penn .....	<i>f</i>	1
910	<i>Porzana bailloni</i> —Vieill .....	<i>m</i>	1
931	<i>Butorides javanica</i> —Horsf.....	<i>f</i>	1
964	<i>Querquedula crecca</i> —Lin.....	<i>f f</i>	1
971	<i>Fuligula cristata</i> —Lin.....	<i>f f</i>	2
978 <i>tes</i>	<i>Larus affinis</i> —Reinh .....	<i>f</i>	1
980	———— <i>brunneicephalus</i> —Jerd .....	<i>m f f f</i>	4
987 <i>bis</i>	<i>Sterna albigena</i> —Licht .....	<i>f</i>	1
Total No. of Species			Total No. of Skins
185.			444

## LIST OF BIRD SKINS FROM BURMAH AND OTHER PARTS OF INDIA.

Presented to the Society by Mr. G. W. VIDAL, C.S., January 1886.

No. in List of Birds of India.	Species.	Locality.	No. and Sex.	No. of Skins of each species.
23 <i>bis</i>	<i>Astur poliopsis</i> —Hume. ....	Borongho .....	<i>m</i>	1
39	<i>Spilornis cheela</i> —Lath.....	Akyab .....	<i>f</i>	1
55	<i>Haliastur indus</i> —Bodd .....	Calcutta.....	<i>f</i>	1
74 <i>sept</i>	<i>Scops Brucii</i> —Hume .....	Poona.....	<i>m</i>	1
77	<i>Glaucidium radiatum</i> (typical)—Tick .....	Raipur, C.P. ...	<i>m</i>	1
142	<i>Hydrocissa albirostris</i> —Shaw.	Burmah .. ..	<i>f</i>	1
144	<i>Meniceros bicornis</i> ( <i>Ocyrceros birostris</i> ) .....	Singbhoon ...	<i>i</i>	1
146 <i>ter</i>	<i>Rhyticeros subruficollis</i> —Bly	Amherst.....	<i>i</i>	1
180	<i>Brachypternus aurantius</i> —Lin	Raipur, C.P. ...	<i>m</i>	1
215	<i>Rhopodytes tristis</i> —Less .....	China, Baheer..	<i>i</i>	1
239	<i>Dicaeum concolor</i> —Jerd. ....	Kotagherry ...	<i>m</i>	1
257 <i>bis</i>	<i>Lanius caniceps</i> —Bly. ....	N. Kanara ...	<i>i</i>	1
261	———— <i>cristatus</i> —Lin. ....	.....	<i>i</i>	1
306	<i>Cyornis tickelli</i> —Bly. ....	Saugor, C. P....	<i>m</i>	1
360	<i>Merula simillima</i> —Jerd. ....	Ootacamund ...	<i>m</i>	1
434	<i>Malacocercus malabaricus</i> —Jerd. ....	Ootacamund ...	<i>m</i>	1
452 <i>dec</i>	<i>Iole viridescens</i> —Bly. ....	Amherst ...	<i>f</i>	1
534	<i>Prinia socialis</i> —Sykes .....	Madras ...	<i>f</i>	1
596	<i>Anthus maculatus</i> —Hodgson .	Etawah ...	<i>m</i>	1
781 <i>bis</i>	<i>Carpophaga cupræa</i> —Jerd. ...	N. Kanara ...	<i>i</i>	1
843	<i>Glareola lactea</i> —Tem. ....	Murda .....	<i>i</i>	1
847	<i>Ægialitis mongola</i> —Pall .....	Karachi .....	<i>m</i>	1
848	———— <i>cantiana</i> —Lath ...	Diamond island	<i>m</i>	1
859	<i>Ædicnemus scolopax</i> —S. G. Gm. ....	Etawah ...	<i>i</i>	1
24				24

# CATALOGUE OF SNAKES IN THE SOCIETY'S COLLECTION.

Family.	Genera and Species.	Locality.
I.—TYPHELOPIDÆ (Blind Snakes.)	Typhlops porrectus .....	Bandora.
II.—TORTRICIDÆ (Short-tailed Earth Snakes)	None.	
III.—PYTHONIDÆ (Pythons.)	Python molurus.....	Lanowli.
	Python reticulatus .....	In a ship from Rangoon.
IV.—ERYCIDÆ (Sand Snakes.)	Eryx johnii .....	
	Do. ....	
	Gongylophis conicus .....	
	Do. ....	
V.—ACROCHORDIDÆ (Wart Snakes.)	Chersydrus granulatus.....	Bombay Harbour.
	Do. ....	Do.
	Do. ....	Do.
	Do. ....	Alibag.
VI.—UROPELTIDÆ (Rough-tailed Earth Snakes)	Silybura brevis .....	Khandalla.
VII.—XENOPELTIDÆ (Iridescent Earth Snakes.)	None.	
VIII.—CALAMARIDÆ (Dwarf Snakes.)	Aspidura trachyprocta .....	Ceylon.
	Do. ....	Do.
	Do. ....	Do.
	Do. ....	Do.
IX.—HOMALOPSIDÆ (River Snakes.)	Cerberus rhynchops .....	Alibag.
	Do. ....	Do.
	Do. ....	Born in Society's rooms.
	Do. ....	Do.
	Sp. nova.....	Saugor, C. P.
	Do. ....	
X.—AMBLYCEPHALIDÆ (Blunt-headed Snakes.)	None.	
XI.—OLIGODONTIDÆ (Filleted Ground Snakes.)	Simotes Russellii .....	Bombay.
	Do. ....	Alibag.
	Oligodon subgriseus.....	
	Do. ....	
	Oligodon fasciatus .....	Bombay.
	Oligodon spilonotus .....	Do.
XII.—LYCODONTIDÆ (Harmless-fanged Snakes.)	Lycodon aulicus .....	Tanna.
	Do. ....	Bombay.
	Do. ....	Do.
	Do. ....	Do.
	Do. ....	Do.
	Do. ....	Do.
XIII.—COLUBRIDÆ—		
I.—Group CORONELLINA (Ground Colubers.)	Cyclophis calamaria .....	Mahableshtar.
II.—Group COLUBRINA (Agile Colubers.)	Zamenis fasciolatus .....	Khandalla.
	Do. ....	Tanna.
	Cynophis malabaricus .....	Khandalla.
	Ptyas mucosus juv. ....	Bombay.
	Do. juv. ....	Do.
	Do. juv. ....	Do.
	Do. (head of adult)..	Do.
	Do. (head of adult)..	Do.



Family.	Genera and Species.	Locality.
<b>XIII.—COLUBRIDÆ—<i>ctd.</i></b>		
III.—Group DRYADINÆ (Bush Colubers.)	None.	
IV.—Group NATRICINÆ (Amphibious Colubers.)	<i>Tropidonotus quincunciatus</i>	Bombay.
	Do. ....	Do.
	Do. ....	Alibag.
	Do. <i>stolatus</i> ....	Bombay.
	Do. ....	Do.
	Do. ....	Do.
	Do. <i>Beddomii</i> ...	Mahableshwar.
	Do. <i>plumbicolor</i> ...	Khandalla.
<b>XIV.—DENDROPHIDÆ</b> (Tree Snakes.)	None.	
<b>XV.—DRYIOPHIDÆ</b> (Long-nosed Tree Snakes.)	<i>Passerita mycterizans</i> .....	Tanna.
	Do. ....	Bombay.
	Do. ....	Do.
<b>XVI.—DIPSADIDÆ</b> (Broad-headed Tree Snakes)	<i>Dipsas gokool</i> .....	Do.
	Do. ....	Saugor, C. P.
	Do. ....	
	Do. ....	
	<i>Dipsas ceylonensis</i> .....	Alibag.
<b>XVII.—PSAMMOPHIDÆ</b> (Desert Snakes.)	None.	
<b>XVIII.—ELAPIDÆ</b> (Venomous Colubrine Land Snakes)	<i>Bungarus arcuatus</i> .....	Bombay.
	Do. ....	Saugor, C. P.
	Do. ....	
	<i>Naga tripudians</i> .....	Bombay.
	Do. (head) .....	Do.
	Do. juv. ....	Born in Society's rooms.
	Do. (embryo, with tooth for cut- ting egg.)	
	<i>Callophis trimaculatus</i> .....	Mahableshwar.
	<i>Ophiophagus elaps</i> (skin)..	Canara.
<b>XIX.—HYDROPHIDÆ</b> (Sea Snakes.)	<i>Enhydrina bengalensis</i> .....	Bombay Harbour.
	Do. ....	Do.
	Do. ....	Do.
	<i>Hydrophis diadema</i> .....	Bombay Harbour.
	Do. ....	Do.
	Do. ....	Do.
	Do. ....	Do.
	<i>Hydrophis robusta</i> .....	Alibag.
	<i>Pelamis bicolor</i> .....	Do.
	Do. ....	Do.
	Do. ....	Do.
	Do. ....	Do.
<b>XX.—CROTALIDÆ</b> (Crotali or Pit Vipers.)	<i>Trimeresurus anamallensis</i> .	Khandalla.
	Do. (head) .....	Do.
	<i>Hypnale nepa</i> .....	Ceylon.

Family.	Genera and Species.	Locality.
XXI.—VIPERIDÆ (Vipers.)	Echis carinata .....	Rutnagiri.
	Do. ....	Do.
	Do. ....	
	Daboia elegans .....	Bandora.
	Do. (head of 61' specimen.)	Hurda, C. P.
	Do. ....	Bombay.
	Do. ....	Do.
	Do. ....	Do.

## NOTE.

It will be seen that in the Society's collection there are no specimens of the genera belonging to the following families :—

Fam. II.—TORTRICIDÆ (Short tailed Earth Snakes).

„ VII.—XENOPELTIDÆ (Iridescent Earth Snakes).

„ X.—AMBLYCEPHALIDÆ (Blunt-headed Snakes).

XIV.—DENDROPHIDÆ (Tree Snakes).

XVII.—PSAMMOPHIDÆ (Desert Snakes).

Up-country members who are willing to assist the Collection, can have jars, containing spirits of wine, sent to them on application.

H. M. PHIPSON,  
*Honorary Secretary,*  
REPTILE SECTION.

## PROCEEDINGS OF THE SOCIETY DURING THE QUARTER.

THE usual monthly meeting of this Society was held on Tuesday evening, 5th January, in the rooms at 6, Apollo Street. There was a large attendance of members. Dr. Macdonald having taken the chair, the minutes of the last meeting were read.

The following new members were then elected :—Lientenant-Colonel Rowlandson, Captain Gerald Martin, Captain E. F. Marriott, Surgeon Horace Yeld, Miss E. Rich, Khansaheb Dinshahjee Dosabhai Khambatta, Rao Bahadoor Ragoonath Mahadev Kelkar, the Rev. Mr. Alexander, Messrs. W. M. Macaulay, A. C. Parmenides, Anthony Morrison, H. W. Jones and W. W. Squire.

The additions made to the Society's collections since last meeting were reported, as detailed below.

The Secretary reported that His Excellency Lord Reay had accepted the office of President of the Society. He also reported that he had been very successful at the auction of books mentioned at last meeting, having secured 13 separate works on Natural History, most of them rare and of great value.

Mr. Justice Birdwood proposed a vote of thanks to the Secretary, which was seconded by Mr. Sterndale, and carried *nem con.*

Mr. Sterndale then rose to propose a change in Rule VI., which runs thus :— "A president and two vice-presidents shall be elected from among the members resident in Bombay." He proposed that this rule should be amended so as to admit of the election of three or more vice-presidents, as in a place like Bombay, where many members are at certain seasons of the year absent, two are not sufficient. He also proposed that Mr. Justice Birdwood should be elected as a third vice-president.

On the suggestion of Dr. Bainbridge, these proposals were put separately, and, the first being seconded by Mr. F. N. Daver, was carried. Regarding the second, Mr. Kanga thought notice of it should have been given.

The Secretary said that notice of the intention to make a change in Rule VI. had been duly given, as required by the rules themselves ; but that he had not thought it necessary to give notice of Mr. Sterndale's intention to propose that Mr. Birdwood should be elected one of the vice-presidents.

Mr. Sterndale then rose to explain that his reason for wishing the matter carried through at this meeting was only this, that it seemed very desirable to have the governing body complete for insertion in the first number of the journal which he hoped would be in the hands of members by the 15th of this month.

Mr. Kanga at once agreed to this, and the motion, being seconded by Colonel Walcott, was carried unanimously.

The Secretary mentioned that the skulls presented to the Society by Mr. Shillingford of Purneah, which were acknowledged at last meeting, had since arrived and were now on exhibition in the room.

Mr. Sterndale proposed a vote of thanks to the Agent of the E. I. Railway for his courtesy in conveying the heads free of charge, which was seconded by Mr. Leslie Crawford and carried.

Mr. Justice Birdwood then exhibited some fruits of the *Ghela* (*Randia dumetorum*), a tree common at Matheran, which were inhabited by the larva of a butterfly, one of the *Lycænidæ*. The insect had in each case made a hole through the hard rind of the fruit and come out for the purpose of securing the fruit to the stalk with silk, lest it should fall. Some other curious phenomena were exhibited, and the meeting closed.

CONTRIBUTIONS.

CONTRIBUTORS.

Head of Jackal (with solitary horn between the ears) .....	Dr. K. B. Kirtikar.
Specimens of the Flora of Western Australia ...	Capt. O'Grady.
2 Walrus Tusks .....	Capt. W. Walker.
2 Australian Boomerangs .....	Do.
1 Live Koel ( <i>Eudynamis honorata</i> ) .....	Col. Bissett.
A quantity of fresh water fishes and crustaceans .....	W. Sinclair, C.S.
2 Bats .....	Do.
Live Octopus and Fish .....	Miss Walcott.

*Minor Contributions*—From Messrs. K. O. Campbell, Gibson, W. J. Essai, Rev. A. B. Watson, and Mr. L. P. Russell.

*Exhibits*—A live crested Hawk Eagle (*Limnæetus cristatellus*), by H. M. Phipson.

*Additions to the Library*.—*Malabar Fishes* (Day), presented by Mr. C. P. Cooper.

THE annual meeting of this Society was held on Monday, the 1st February, at 6, Apollo Street. Dr. Macdonald having taken the chair, the minutes of the last meeting were read and confirmed. The following new members were elected :—Dr. J. C. Lishoa, Miss Oliver, Miss R. Oliver, Colonel Goodfellow, Dr. H. Cooke, Messrs. W. Woodward, H. G. Palliser, J. Steiner, L. C. Balfour, B. B. Russell, John Chrystal, N. Spencer, P. Reynolds, C. Lowell, J. C. Francis, G. Oliver, N. H. Chowksey, and G. Manson.

The accounts for 1885 were put in. Mr. Sterndale proposed that Mr. F. G. Kingsley should be requested to audit them. The motion was seconded by Mr. Justice Birdwood and carried.

The Secretary proposed that a managing and financial committee should be appointed under Rule XIV., consisting of the following *ex-officio* members, with powers to add to their number :—The vice-presidents of the Society, the presidents and secretaries of the sections, and the secretary and treasurer of the Society. He also proposed that Mr. F. G. Kingsley should be appointed treasurer. The motion was seconded by Mr. Kanga and carried unanimously.

Mr. N. S. Symons proposed that the funds of the Society should be deposited in a bank and a banking account kept. This was seconded by Mr. Jefferson, and carried.

The additions to the collections and library since last meeting were acknowledged as detailed below.

Mr. Justice Birdwood proposed a special vote of thanks to Mr. G. W. Vidal and Mr. A. Newnham for their valuable contributions, which was seconded by Mr. Starling, and carried.

Mr. Sterndale then exhibited a curiously deformed horn of the Cashmere stag obtained by exchange from M. Dauvergne, on which he made some interesting remarks, showing how the deformity had probably been caused. He also exhibited and made some remarks on the skin of a tiger-cat. Mr. Aitken read a note by Mr. Newnham on the frequent occurrence of albinism in Cutch, adding some remarks on instances from his own experience, tending to show that a sandy soil and dry climate exercised what might be called a bleaching effect on the colour, not only of birds and beasts, but of insects also.

Before the meeting closed the Secretary intimated that he had found a practical European taxidermist in want of employment, with whom he had entered into an engagement which he hoped would enable the Society to undertake any kind of work, such as curing skins, mounting heads and setting up birds, not only for members, but for other sportsmen and naturalists. All arrangements would, of course, be made through Mr. E. L. Barton, whose name would be a guarantee for the artistic finish of all work undertaken.

*Contributions.*—450 birds' skins, by Mr. G. W. Vidal, C.S.; skin of hamad-rayad (*Ophiophagus Elaps*), by Mr. G. W. Vidal, C.S.; one snake (*Zamenis Fasciatus*), by Mr. G. W. Vidal, C.S.; 102 birds' skins, from Bhooj, by Mr. A. Newnham; large ant's-nest, by Mr. W. Shipp; one stuffed fish (*Barbus Carnaticus*), by Mr. H. M. Phipson, a quantity of small fresh-water fishes, by Mr. W. Sinclair, C.S.; three skins of *Capra Sibirica*, the Himalayan ibex, showing the colouring at three different seasons, by Mons. H. Danvergne; one pigmy shrew, by Mr. H. Littledale; two hammer-headed sharks, by Dr. Hatch.

*Minor contributions* by Messrs. F. A. Little, John Chrystal, W. Shipp, W. Thacker, J. M. Mitchell, W. T. Smith, W. LeGeyt, K. M. Sbroff, and D. E. Aitken.

*Contributions to Library.*—Birds of the Bombay Presidency (Barnes), by the author; Encyclopedie d' Histoire Naturelle (Vol. 1-6), J. Pontz.

THE monthly meeting of the Society was held on Monday, March 1, in the Rooms at 6, Apollo Street, and was largely attended. Dr. D. Macdonald took the chair.

The following new members were elected :—Captain G. Wilson, Mr. D. Morris, Mr. J. H. C. Dunsterville, Mr. G. J. R. Rayment, Dr. Gaye, Mr. E. M. Walton, Major W. S. Bisset, R.E., Mr. G. H. R. Hart, Miss Hart, Mr. G. Fletcher, Mr. J. Anderson, Cap. T. R. M. Macpherson, Dr. Henderson, Col. Westmacott, Miss Maneckjee Cursetjee, Mr. D. B. Maistry, and Mr. C. C. Mehta.

The following additions made to the Society's collections, since the last meeting, were duly acknowledged :—

126 species of ants and wasps, from Calcutta, by Mr. G. A. J. Rothney.

Several black bucks' heads and birds' skins, from Ahmedabad, by Colonel J. Hills, R.E.

Skull of hippopotamus, from Zanzibar, by Mr. F. D. Parker.

One snake (*Echis carinata*), by Mr. D. E. Aitken.

One Indian monitor (*Varanus dracæna*), by Dr. Kirtika.

One sarus crane (*Grus antigone*), by Mr. John Griffiths.

A quantity of mussels and sponges, Bombay harbour, by Miss Walke.

A quantity of polyps, Bombay harbour, by Mr. W. W. Squire.

Fresh water sponges, by Mr. W. Gleadow.

Four lizards, alive (*Urmastix hardwickii*), by Mr. R. M. Dixon.

Five snakes (*Silybura brevis*, *Chersydrus granulatus*, *Gongylophis conicus*, *Zamenis fasciolatus*, *Lycodon aulicus*), by Mr. H. M. Phipson.

Minor contributions from Messrs. H. W. Barrow, H. B. Mactaggart, J. Bristed, W. A. Collins, Thos Lidbetter, J. D'Aguiar, Major Kirkwood, and Captain Miller.

*Additions to the Library.*—Cyclopaedia of India, 3 vols. (Balfour), from W. Sinclair, C.S.; Asiatic Society Journal for 1885, from the Secretary, Calcutta.

Two panthers, two sambhurs, a cheetul, and a black buck, mounted by the Society's taxidermist for up-country correspondents, were also exhibited.

Mr. E. H. Aitken announced that, as he was about to leave Bombay, he was obliged to resign the position of Honorary Secretary, but expressed a hope that he would still be able to contribute to the Society's collections.

The Chairman proposed a special vote of thanks to Mr. Aitken for the energetic manner in which he had fulfilled the duties of Honorary Secretary since the establishment of the Society.

The vote, on being put to the meeting, was received with applause, and carried unanimously.

Mr. H. M. Phipson was then elected Honorary Secretary.

Mr. E. H. Aitken read an interesting paper on the classification of insects, pointing out the characteristics of the different orders, and describing their development.

The metamorphosis of the dragon-fly was most happily illustrated by the opportune appearance of one of these insects in the winged condition from the pupa state during the course of the lecture.

Mr. Sterndale exhibited some curiously formed horns of the Cashmere stag, showing a bifurcation of the bezel, and a fine head of the musk-deer.





R.A. STERNDAL DEL.

1. OVIS HODGSONI. - 2. HYBRID. - 3. OVIS VIGNEI.





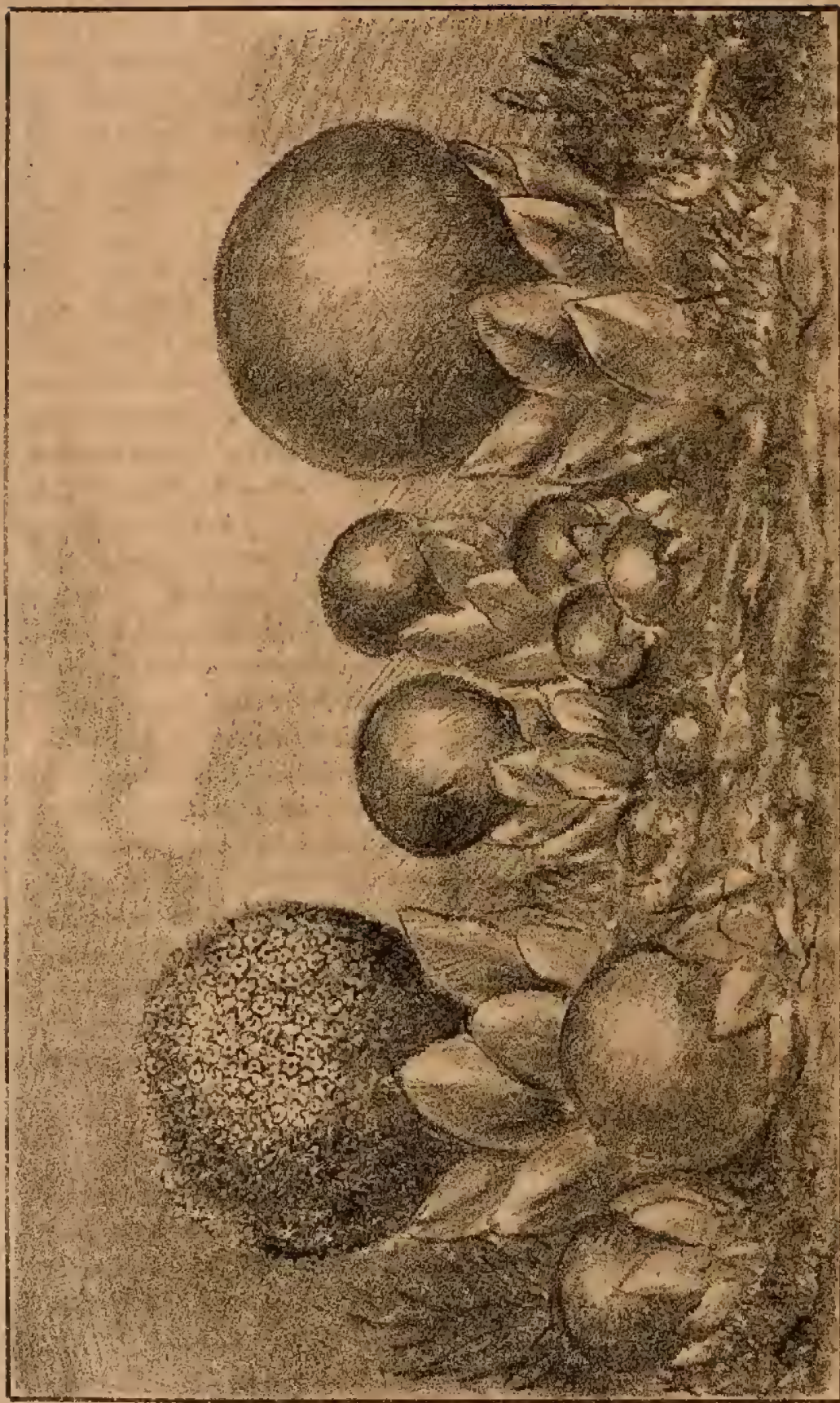
Be...

Abnormal Flowerspike of *Musa Sapientum*.

1/9/85

KRL





BALANOPHORA SP.